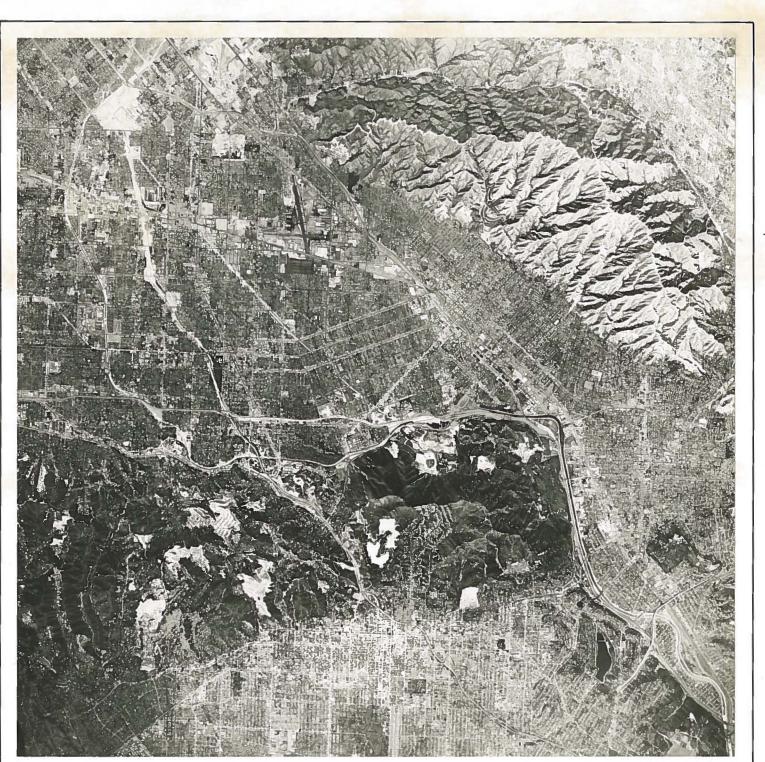
Aerial Remote Sensing of Ground-Water Contamination Sources



SFUND RECORDS CTR 2166-9543

Eastern
San Fernando
Valley: 1937-1964

December 1986



Environmental Programs Office 1050 E. Flamingo Road, Suite 120, Las Vegas, Nevada 89119 (702) 734-3200

AERIAL REMOTE SENSING OF GROUND-WATER

CONTAMINATION SOURCES

EASTERN SAN FERNANDO VALLEY: 1937-1964

December 1986

Prepared for:

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Environmental Programs Office 1050 E. Flamingo Road, Suite 120, Las Vegas, Nevada 89119 (702) 734-3200

December 22, 1986

Mr. Bob Miland, Director Environmental Affairs Lockheed-California Company P.O. Box 551 Burbank, California 91520-3903

Dear Bob:

Please find enclosed four (4) copies of the report "Aerial Remote Sensing of Ground-Water Contamination Sources - Eastern San Fernando Valley: 1937-1964." As expected, the study area has historically contained numerous possible ground-water contamination sources that are extensively detailed and documented in the report.

This study clearly demonstrates that ground-water quality in the east valley is a regional problem, with nearly 100 historical contamination sources identified so far.

However, much more can be done to pinpoint potential pollution sources such as public/private dumps, industrial activities, drum storage yards, and similar facilities up-gradient from CALAC. Specifically, we recommend the following:

- Round-out the results of the present study by analyzing aerial data available for 1937, 1975, 1979, 1982, and 1985.
- Acquire and analyze new, high-resolution color aerial data over the study area. By doing this we can maximize our ability to detect existing potential contamination sources. Hundreds of new sources may appear at high resolution.
- Perform a historical remote sensing analysis (1937-1985)
 focusing on CALAC facilities only and excluding surrounding
 areas. We would provide greatly enlarged images of plants A-1,
 B-1, B-6 and other areas you deem appropriate. This approach
 may inform CALAC of conditions previously unsuspected or provide
 corroboration of those on which you have limited information.

Services Company, Inc.

Bob Miland Delivery of Report Page 2

Six copies were made of this report. You received four, Fred Reed at CORLAC received one, and we retained one copy of the report for our files. We hope this document fulfills your expectations and look forward to assisting you and Lockheed-California Company in the future.

If we can be of further help or if any questions arise, please call Ken Asbury at (702) 734-3267 or me at (702) 734-3212.

Very/truly yours,

Scott H. Page

Senior Scientist

Environmental Programs

SHP:mwk

cc: J. R. Donaldson

K. Asbury T. H. Mace

AERIAL REMOTE SENSING OF GROUND-WATER CONTAMINATION_SOURCES EASTERN SAN FERNANDO VALLEY: 1937-1964

December 1986

Project Participants

Scott H. Page, Principal Investigator

Mr. Page had overall responsibility of aerial imagery data acquisition, processing, analysis, and presentation, with special emphasis on 1937 and 1941 in this report. Mr. Page graduated from the University of Florida in 1976 with a degree in Geography and Physical Geology and has studied digital image processing, geological science, and microcomputer operations at the University of Nevada-Las Vegas. He joined Lockheed-EMSCO in 1978. He has ten years of remote sensing experience in a wide variety of areas including surface mining, environmental resource summaries, thermal infrared mapping, digital image processing, land use analysis, and hazardous waste site monitoring.

Mark A. Finkbeiner, Assistant Investigator

Mr. Finkbeiner was responsible for aerial imagery analysis with emphasis on 1952 through 1964 for this report. He received a B.S. in Geography/Remote Sensing from Northern Arizona University in 1979. Mr. Finkbeiner has worked with Lockheed-EMSCO's image analysis laboratory since 1979. His work has included historical land-use classifications, inventories, flood mapping, and intensive analysis of hazardous waste sites under federal regulations.

Richard C. Buell, Technical Illustrator

Mr. Buell was responsible for all aspects of graphic design and map and overlay production. He has nearly 30 years experience in all phases of technical graphics and cartography, primarily with the U.S. Navy. He has been a technical illustrator with Lockheed-EMSCO since 1978.

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1.0 INTRODUCTION AND SYNOPSIS

Lockheed-California Company (CALAC) has retained the Environmental Programs Office of Lockheed Engineering and Management Services Company, Inc. (Lockheed-EMSCO) to conduct a historical remote sensing investigation in the eastern San Fernando Valley area of California. The primary objective of this investigation is to locate, identify, and characterize possible ground-water contamination sources using historical (archival) aerial photographs taken over the area from 1937 through 1964.

The study area is a 37-square-mile region of the San Fernando Valley roughly centered on the Hollywood-Burbank Airport (Figure 1-1). The study area boundary runs from a point near the base of the Verdugo Mountains at Olive Avenue, southwest along Olive to the Los Angeles River, west along the river to its intersection with Tujunga Wash, north along the wash to near Hansen Dam, then southeast along the base of the Verdugo Mountains to the point of origin.

In recent years, mounting evidence has indicated that ground-water contamination by volatile organic hydrocarbons is widespread in the greater Los Angeles area, including the San Fernando Valley Basin (SFVB). Specifically, trichloroethane (TCE) and perchloroethane (PCE) have been identified as the major contaminants affecting ground-water quality in the SFVB. TCE and PCE are considered the major contaminants because they have been found in the highest concentrations and in the largest number of wells.

Some work has been done to identify potential sources of this contamination in the SFVB by using techniques such as mail surveys, drivethroughs, records searches, industrial waste discharge records and permits, hazardous materials spills reports, and inferences based on general land use patterns. Such techniques are very useful and contribute greatly to the knowledge base; however, they are usually limited to a small area by logistical problems and cost. In addition, these techniques cannot effectively characterize temporal effects or provide a comprehensive perspective of the problem.

Remote sensing is unique in its ability to provide synoptic and temporal views of the environment. Synoptic information is acquired from high-altitude or multiple-image data sets. Temporal information is obtained by comparatively analyzing a series of images to detect changes and to locate, identify, and characterize those changes.

This report provides synoptic and temporal views on possible ground-water contamination sources using the retrospective technique of stereoscopically analyzing aerial photographs taken over the study area from 1937 through 1964.

Analysis of more than sixty archival photographics of the study area shows that numerous potential sources of ground-water contamination have existed historically in the eastern San Fernando Valley. Overall, 99 discrete potential contamination source areas were observed in the study area for the period, 1937 through 1964. A breakdown of general facility types follows:



General Facility Type	Number Observed
Gravel extraction pits, other pits, and trenches	19
Utilities (electrical substations and power plants)	3
Aircraft manufacturing and support plants	6
Airports (including runways, terminals, hangars, and aircra parking aprons)	ft 1
Dumps, landfills and other waste disposal areas (excluding gravel extraction)	11
Industrial-Commercial facilities (including liquid	
storage tanks, drum storage areas, and other miscellaneou light-to-heavy manufacturing facilities)	. s 59

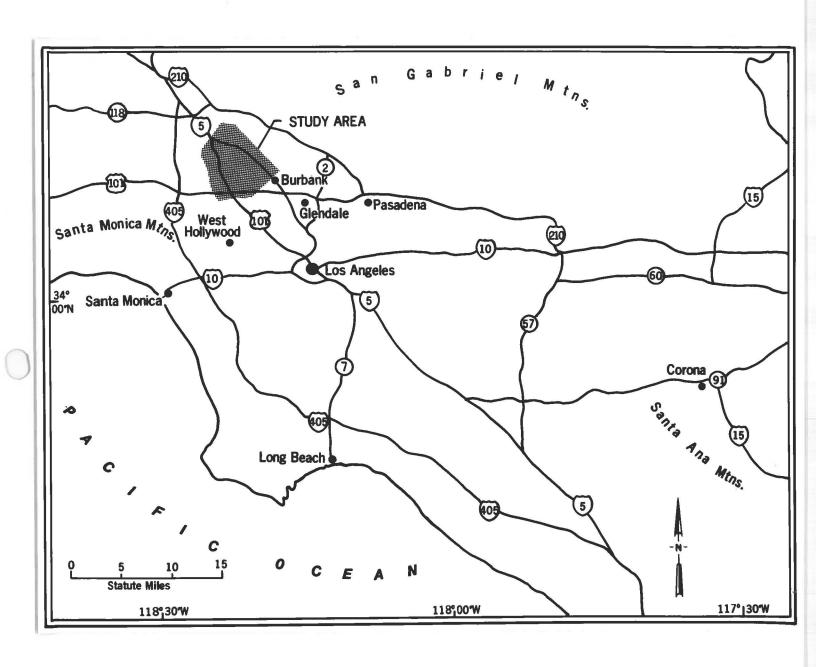


Figure 1-1. Location of Eastern San Fernando Valley Study Area



2.0 ENVIRONMENTAL SETTING

2.1 Physiography

The study area is located in the southeast corner of the San Fernando Valley. The area slopes south-southeastwardly wardly from an elevation of approximately 900 feet above sea level near Hansen Dam to approximately 550 feet in Burbank. Above the east side of the area are the Verdugo Mountains that rise to 2,500 feet above the valley and the City of Burbank. The south side of the study area is partially bordered by the Santa Monica Mountains near Cahuenga Pass. The entire study area is on colluvial and alluvial valley fill and is essentially free of bedrock exposures and outcrops.

2.2 General Geology

The central study area is characterized by 1,000 to 1,200 feet of alluvium overlying crystalline and sedimentary bedrock. The valley fill alluvium consists mostly of sand and gravel with some cobbles and boulders and thin, discontinuous clay-silt lenses. A thicker (100 to 200 feet), near-surface clay layer occurs from Lankershim Boulevard east to San Fernando Road. More commonly, clays are present below 300 feet and are separated by sands and gravels (Proposed Ground-Water Monitoring Program, Lockheed-California Company, Burbank, California. Gregg and Associates, 1985).

2.3 Surface Hydrology

Natural drainage patterns in the area have been altered primarily by channelization and by creation of runoff detention features (spreading grounds) that retain channelized flow for infiltration. The surface hydrologic features identified in the course of this study are:

- 1) Tujunga Wash
- 2) Tujunga Wash Central Branch
- 3) Burbank Western Channel
- 4) Los Angeles River
- 5) Hansen Heights Channel
- 6) La Tuna Canyon Lateral
- 7) Tujunga Spreading Grounds
- 8) Hansen Spreading Grounds
- 9) Headworks Spreading Grounds
- 10) Hansen Dam and Flood Control Basin
- 11) Sepulveda Dam and Flood Control Basin

A detailed drainage analysis showing the hydrologic relationship among all these features is presented on Photograph 9-1 in Section 9.0.

Engineering and Management Services Company, Inc.

2.4 Subsurface Hydrology

Regional ground-water movement in the San Fernando Valley trends northwest to southeast, although this pattern has varied historically as a result of the distribution of rate recharge (water spreading grounds) and discharge (pumping) (Los Angeles Department of Water and Power, and Gregg, 1985). Within the study area, ground-water follows a more south-southeastward direction. The reported flow direction at Lockheed facilities in Burbank is from 16° west of north (T. Carberry - CALAC, personal communication). The potentiometric surface elevation in 1984 ranged from more than 600 feet above mean sea level (MSL) at the north end of the study area to approximately 450 feet MSL at the south end (Figure 2-1). Depths to groundwater vary between approximately 350 and 100 feet (northwest to southeast).

Ground-water flow rates are also quite variable in the region. In general, flow velocities increase from west to east, varying from 5 feet per year at the extreme west end of the San Fernando Valley Basin to 300 feet per year in the central study area. A flow vector (ground-water cascade) of 500 feet per year has been mapped along the western base of the Verdugo Mountains and appears to be related to faulting (Los Angeles Department of Water and Power, and Gregg, 1985) (See Figure 2-2).

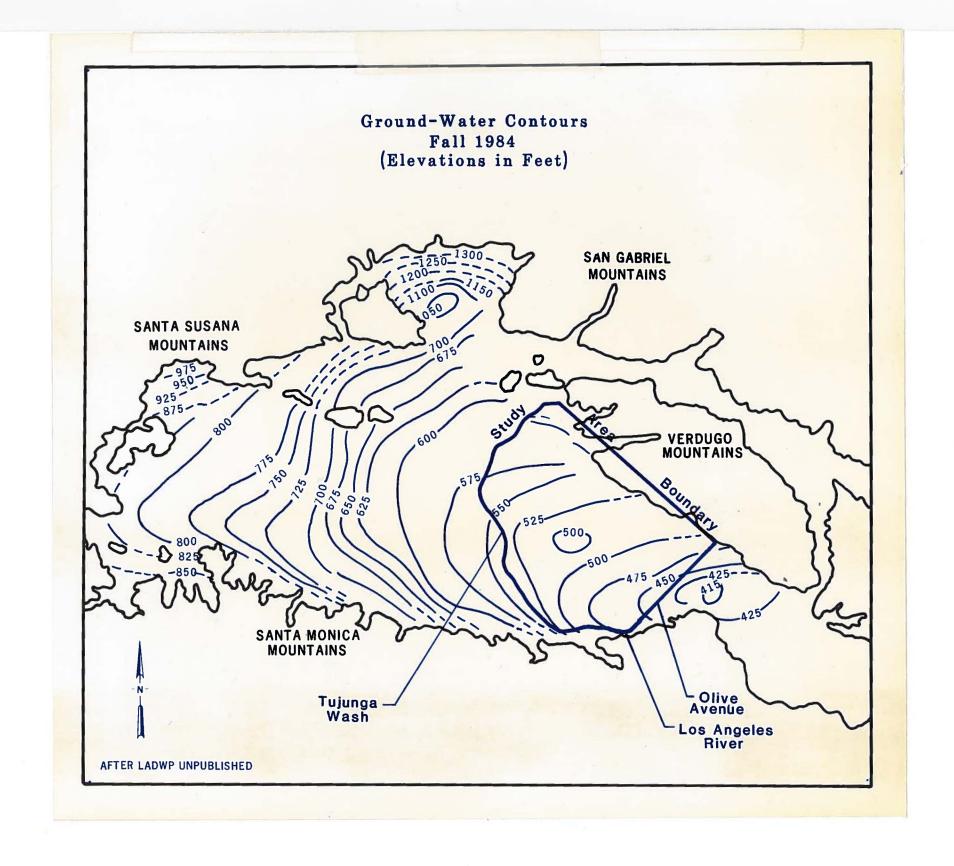


Figure 2-1. San Fernando Basin Ground-Water Contours in 1980.

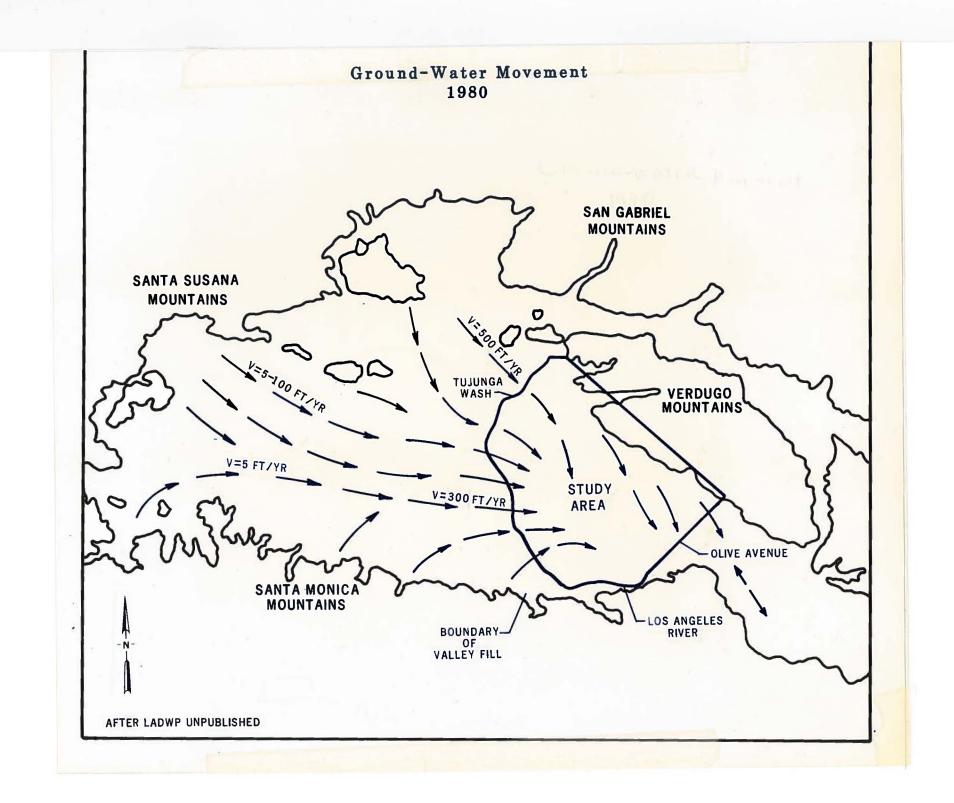


Figure 2-2. San Fernando Basin Ground-Water Movement - Fall 1980

3.0 DESCRIPTION OF TECHNIQUES

Aerial photography provides a unique and synoptic perspective for locating and identifying hazardous waste environmental pollution. Through overhead observation of physical features found in spatial association with waste sites, an investigator can quickly assess the magnitude or extent of the problem. Additionally, the assessment can be performed in areas where site size, access, or hazardous conditions preclude efficient ground-based observations.

3.1 Evidence of Waste Release or Disposal

Analysis of aerial photographs frequently provides evidence of hazardous waste release or disposal. Characteristic features include:

- Areas of pooled or standing liquid
- · Ground discoloration
- Sheen on water surfaces
- · Storage tanks or drums
- Surface impoundments and lagoons
- Point-source discharges and outfalls
- · Landfills, solid waste dumps, mounded materials
- · Pits, trenches, or excavations
- Vegetation stress or damage

A more in-depth discussion on the identification of these features in aerial photographs and their relationship to ground-water contamination pathways follows in sections 3.5.3 and 3.5.4.

3.2 Identification of Related Features

Aerial photographs may provide a convenient data source on land use, facilities, above-ground utilities, surface hydrology, floodplains, and ground-water recharge and discharge areas. Depending on the nature of the investigation, the following information on contaminated and hazardous waste sites may also be obtained from aerial photographs.

- Structures
- · Storage, treatment, and disposal areas
- Security measures

- Transportation routes
- Site boundaries and sizes
- Containment systems evaluation
- Run-off and run-on monitoring
- Spill or release planning (direction/quantity)
- · At-risk populations and areas

3.3 <u>Historical Photographic Data</u>

Historical (archival) aerial photographs are a key component for characterizing hazardous and contaminated sites. This type of information can provide a chronology of site activity regarding disposal practices, types of wastes, expansion areas, access, site size, and boundaries. Historical photographs can remove the "disguise" of current land use and can uncover the source of environmental problems. These photographs are often the only definitive record of waste disposal activity at many sites.

In order to locate and identify possible past ground-water contamination sources in the eastern San Fernando Valley, historical (archival) photographs dating from 1937 through 1964 were obtained from academic and federal repositories. These data were assembled to provide stereoscopic coverage of the study area. Table 3-1 provides specifications for the historical aerial photographs presented in this report.

	TABLE 3-	1. AERIAL PI	HOTOGRAPHY SPEC	CIFICATIONS	
Aerial Flight Year	Acquisition Date	Nominal Scale	Original Data Typel	Data Source2	Original Image Quality
1937 1941 1952 1953 1954 1954 1964 1964	Unknown 25 SEP 41 09 JUL 52 19 NOV 53 07 JUN 54 27 OCT 54 28 JUL 64 20 OCT 64	1:12,000 1:4,800 1:24,000 1:20,000 1:20,000 1:20,000 1:24,000 1:100,000	BW PRINT BW PRINT BW NEG	WHIT WHIT EROS ASCS ASCS EROS EROS	Good Excellent Good Good Good Good Fair

1BW PRINT: Photographs in report copied and reproduced from black-and-white

prints (internegative required).

BW NEG: Photographs in report printed directly from black-and-white

negatives (no internegative required).

WHIT: Fairchild Aerial Photography Collection, Department of Geology,

Whittier College, Whittier, California.

ASCS: U.S. Agricultural Stabilization and Conservation Service, Salt

Lake City, Utah.

EROS: Earth Resources Observation Systems Data Center, U.S. National

Oceanic and Atmospheric Administration (NOAA), Sioux Falls, South

Dakota.

3.4 Principles of Analysis

Stereoscopy is the basis of aerial photographic analysis. Photography is acquired as a series of overlapping frames along a predetermined ground track. The aerial film is viewed through a special instrument that optically reconstructs the ground scene in enhanced three-dimensional detail. Features thus observed can be identified on the basis of color, texture, size, shape, location, context, and association. The investigator then characterizes the scene based on his or her training and experience. An aerial photointerpretation code may be used to label waste-related features in aerial scenes of high complexity or large size.

3.5 Measurement Design

Accurate specification of the area of interest is important. Also, in a large study area such as the eastern San Fernando Valley, it is important to know in advance the location of features and sites of special interest. Although possible ground-water contamination sources are numerous in the study area, this report focuses on those that are spatially resolvable on at least one of the photo dates and that appear to present significant pollution threats.

3.5.1 Photographic Scale and Resolution

The two main variables to be considered in obtaining historical photographic data are scale and resolution. The larger the photographic scale, the higher the resolution (visible detail in the aerial scene). If a large photographic scale is selected, however, more exposures are needed to cover a given area. A balance usually must be drawn between the size of the study area (number of exposures) and the size of the feature(s) of interest (resolution). Once an acceptable balance is reached, a photo acquisition plan can be developed. Figure 3-1 illustrates the effects that altitude and camera focal length have on photographic scale and ground coverage for two commonly used earth resources survey aircraft, the U-2 and the Aero Commander. In this report, scale and resolution variables were predetermined by the available historical photographic data.

3.5.2 Quality Control and Assurance

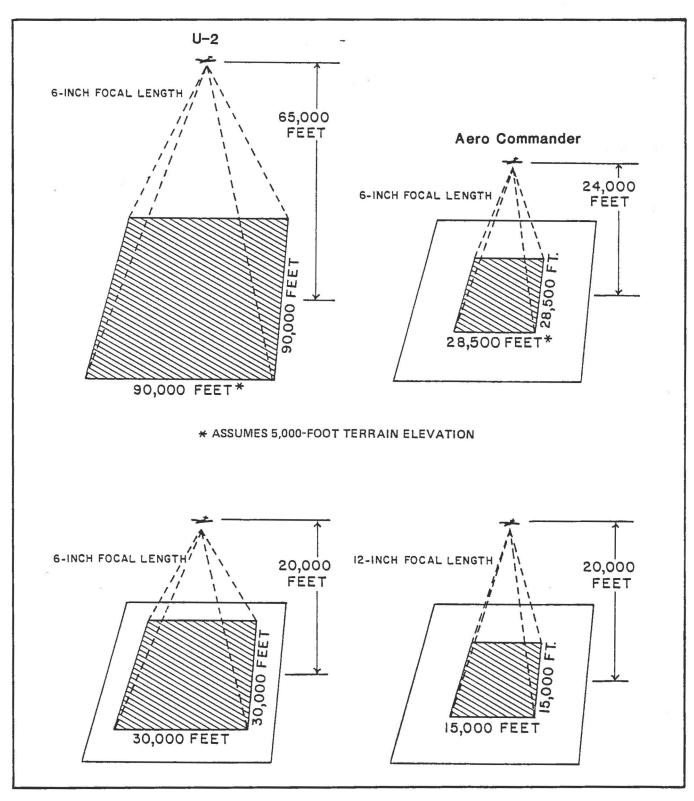
Quality control and assurance checks were performed in all phases of this aerial photography interpretaion. Summarized they are:

Planning phase:

- . define data requirements
- . access and query remote sensing data bases
- . define auxiliary data requirements

Data Acquisition Phase:

specify and acquire historical remote sensing data



From: Notes on Aerial Films and Remote Sensor Systems, EROS Data Center (NOAA) 1978

Figure 3-1. Photo Ground Coverage by Earth Resources Survey Aircraft.

Data Reduction and Processing:

- . search film data against project requirements
- verify auxiliary data against project specifications

Data Analysis:

- . use standard image analysis references
- . screen analysis for completeness and data requirements
- obtain independent verification by in-field personnel, site visit, or third analyst

Final Documentation:

- . review technical report draft
- . obtain all final approvals
- . publish report

3.5.3 Explanation of the Interpretation Code

Despite the visual complexity of terrain comprising the industrialized urban landscape, image analysts of the Environmental Programs Office of Lockheed-EMSCO have determined that relatively few features can be repeatedly and reliably identified as possible ground-water contamination sources in aerial photographs. An aerial photointerpretation code has been developed to label these waste-related features in aerial scenes of high complexity or large size. The following is a brief explanation of the code.

ground reacute	Groun	d	Feat	ure
----------------	-------	---	------	-----

Explanation

Crates	/Boxes	(CR)) –

An empirical or indirect indication of waste generation, processing, or storage; identified on the basis of their unique size and shape, these features are particularly suspect when found near other disposal objects.

Dike -

A structure used to retain runoff or to contain liquids; frequently used to reinforce surface impoundments and industrial lagoons.

Disturbed Ground (DG) -

An area where the natural vegetative or soil cover has been disturbed or disrupted, usually by mechanical means; may be an indication of partial or shallow waste burial or covering.

Drums (DR) -

Cylindrical containers used to hold large volumes of liquid industrial waste; when these are detected at landfills, gravel pits, open dumps, or other inappropriate sites, a strong suggestion of possible ground-water contamination exists small size makes individual detection difficult; usually found stacked or in orderly arrangements.

Ground Feature

Explanation

Fill (FL) -

Usually clean earthen material used to bring a construction site up to level grade; describes cover material used in landfilling operations; also introduced to cover, bury, or obscure improperly handled wastes.

Horizontal Tank (HT) -

Similar to vertical tank, but easier to detect in aerial imagery because of larger surface area visible to sensor; frequently contains pressurized gases that volatilize on release; usually assumed to be of as great a pill threat as vertical tanks.

Impoundment (IM) -

Liquid-holding storage or treatment structures usually unlined and reinforced by earthen dikes; unlined earthen structures present a particular ground-water pollution threat from seepage or overtopping; wastes usually arrive by pump truck.

Lagoon (LG) -

Similar to surface impoundment but usually distinguished by greater permanence and structural integrity such as liners, security fencing; usually designed for liquid waste treatment, settling, or aeration before final disposal; wastes usually piped into facility.

Mounded Materials (MM) -

Unconsolidated or loosely consolidated solid waste dumped from trucks or conveyors assumes an angle of repose resembling a mound; disposal material may range in composition from clean dirt to toxic sludges; uneven, hummocky texture enables quick remote detection.

Solid Waste (SW) -

A general term used to identify a disposal material that cannot be more specifically characterized because of its location, concentration, or composition; or because sensor resolution does not allow detailed discrimination.

Stain (ST) -

A discolored, usually dark-toned area on the ground surface resulting from single or repeated spills, leaks, or dumping episodes; smaller stains suggest isolated or occasional leaks or spills; larger, concentrated, or darker areas indicate inadequate waste handling techniques or deliberate dumping; may result from leaking drums, pipes, industrial and petrochemical liquid storage tanks, or from automotive, heavy machinery, or aircraft operations.



Ground Feature

Explanation

Standing Liquid (SL) -

Any free liquid that is standing or ponded on the ground or that is held in a containment structure; industrial processes often discharge waste liquids to holding structures or to other areas where their unique reflectance properties make them easily detectable on aerial photographs.

Trench (TR) -

An excavated feature much longer than it is wide; usually dug specifically for the purpose of burial; easily detectable based on its unique shape.

Vertical Tank (VT) -

Associated with industrial liquid storage, processing, distribution; includes fuels and petrochemicals; a source of possible pollution from spills, leaks, or poor industrial housekeeping; lack of containment structure around tanks suggests a massive spill or leak could reach ground water.

Waste Disposal Area (WD) -

A general term identifying land disposal sites that cannot be confidently assigned a particular category such as a landfill or an abandoned gravel pit; or an area that may have functional elements of more than one or two particular categories; may also include open or promiscuous dumping areas or areas where wastes may be temporarily placed before final disposal.

3.5.4 Pathways for Ground-water Contamination

For the purpose of image analysis, five pathways for potential chemical contamination to ground water were considered to be likely within the eastern San Fernando Valley study area:

- . seepage from unlined lagoons and other surface impoundments.
- . improper landfilling
- . improper surface and subsurface disposal (dumping)
- . leaks in pipes, processing equipment, and storage tanks
- accidental spills

Table 3-2 assesses the link between these five pathways and the commonly associated ground features explained in the interpretation code. Although interpretation of the linkages requires some subjectivity, working knowledge developed by image analysts studying hundreds of uncontrolled hazardous waste sites suggests that the linkages are valid.

TABLE 3-2. RELATIONSHIP BETWEEN GROUND-WATER CONTAMINATION PATHWAYS AND GROUND FEATURES					
CONTAMINATION PATHWAY					
GROUND FEATURE	Seepage from unlined lagoons and other surface impoundments	Improper landfilling	Improper surface and subsurface disposal (dumping)	Leaks in pipes, processing equip., and storage tanks	Accidental spills
Disturbed ground	4	1	1	4	4
Drums	4	3	3	4	2.
Excavation	4	2	2	4	4
Fi11	4	1	2	4	4
Ground stain	1	3	3	1	1
Lagoon	1	4	3	4	3
Liquid storage tanks	4	4	4	1	2
Mounded materials	4	2	2	4	4
Solid waste	4	1	1	4	4
Standing liquid	2	4	3	2	1
Surface impoundment	1	4	3	4	3
Trench	4	2	2	4	4

- 1 almost always related
- 2 usually related
- 3 occasionally related
- 4 almost never related

3.5.5 Measurement

Analysis of aerial images may include a variety of techniques used to transform the data into information useful for specific purposes.

• Image interpretation (see elements below) Spectral analysis - image tone and brightness Spatial analysis - image shape, location, context, and association Stereoscopic analysis - three-dimensional image examination

Monoscopic analysis - two-dimensional (ocular) image examination

- Image mensuration measurement of spatial features and areas of interest
- Statistical analysis quantitative description of image interpretation results
- Digitizing electronically recording, analyzing, and displaying spatial information

For this report, image interpretation, and to a minor extent, statistical analysis were the main techniques employed.

3.5.6 Data Handling and Report Preparation

Preparation and presentation of final project documentation includes a technical narrative of on-site observations, illustrations including photographic and map overlays, and tables summarizing the results of image analysis.

4.0 1937 AERIAL PHOTOGRAPHIC DATA ANALYSIS

4.1 Summary of Observations for 1937

The 1937 aerial data are of high image quality because of the spatial resolution (scale) and spectral resolution (contrast). One inch on the photograph equals about 1,000 feet on the ground. Because the photograph is high contrast, it was possible to identify and characterize the few possible ground-water contamination sources located in the area. Features as small as individual vertical storage tanks (three feet in diameter and ten feet tall, for example) were detected.

Aerial data for 1937 were available only for the middle one-third of the study area. Coverage was obtained along a 6-mile-long, 2.5-mile wide ground track from Magnolia Avenue in North Hollywood to Sheldon Street in Stonehurst. East-west coverage extends from just east of Hollywood Way to 0.25 mile west of Lankershim Boulevard.

In 1937, land use in the eastern San Fernando Valley was primarily devoted to agriculture and to sand and gravel extraction, especially in the northern study area. Residential development tended to be sparse north of the Southern Pacific rail line, but increased in density along principal arterial highways, such as Lankershim Boulevard in the North Hollywood area. The area around the Hollywood-Burbank Airport (then Burbank-Union Airport) was almost exclusively agricultural.

Of particular interest from a hydrogeological standpoint is the spatial relationship between early sand and gravel extraction pits and a relict floodway of Tujunga Wash. The trace of the wash has been plotted on the available photocoverage from Stonehurst, near the mouth of Big Tujunga Canyon, south to Victory Boulevard. Along its length, this feature historically has been mined for raw materials presumably to feed the rapid urban growth of the eastern San Fernando Valley. The wash can be identified in the imagery by its bright photographic tones, which are indicative of whitish-gray outwash sands. Stereoscopic examination of the wash indicates that it occupies a shallow incised channel approximately 1 to 3 feet deep and 1,000 to 2,000 feet wide. The upper reaches are more deeply incised due to steeper topographic gradient near the drainage source in the San Gabriel Mountains. Toward the south, the wash becomes shallower, wider, and much less defined as agricultural activity and urban development began to mask its original channel zone. Finally, near Victory Boulevard the wash can no longer be clearly identified. The wash apparently acted as an early impediment to agriculture and commercialresidential development. This may have been due to its unstable substrate or public perception of flood hazard. However, no standing water or other evidence of recent flooding is visible in the imagery. It is likely the geomorphology of the wash is related to extreme precipitation and runoff events.

Although 15.5 square miles are covered in the available images, few possible groundwater contamination sources were detected, with the exception of extensive gravel pit development. Isolated fuel and distribution storage



facilities existed along the San Fernando Road north of Clybourn Avenue. Most gravel pits showed no evidence of waste disposal. Several contained standing and free liquids and surface impoundments that appeared to be process wastewater from the sand and gravel mining.

The following is a breakdown by industrial activity of the observed possible ground-water contamination sources for the 1937 aerial imagery:

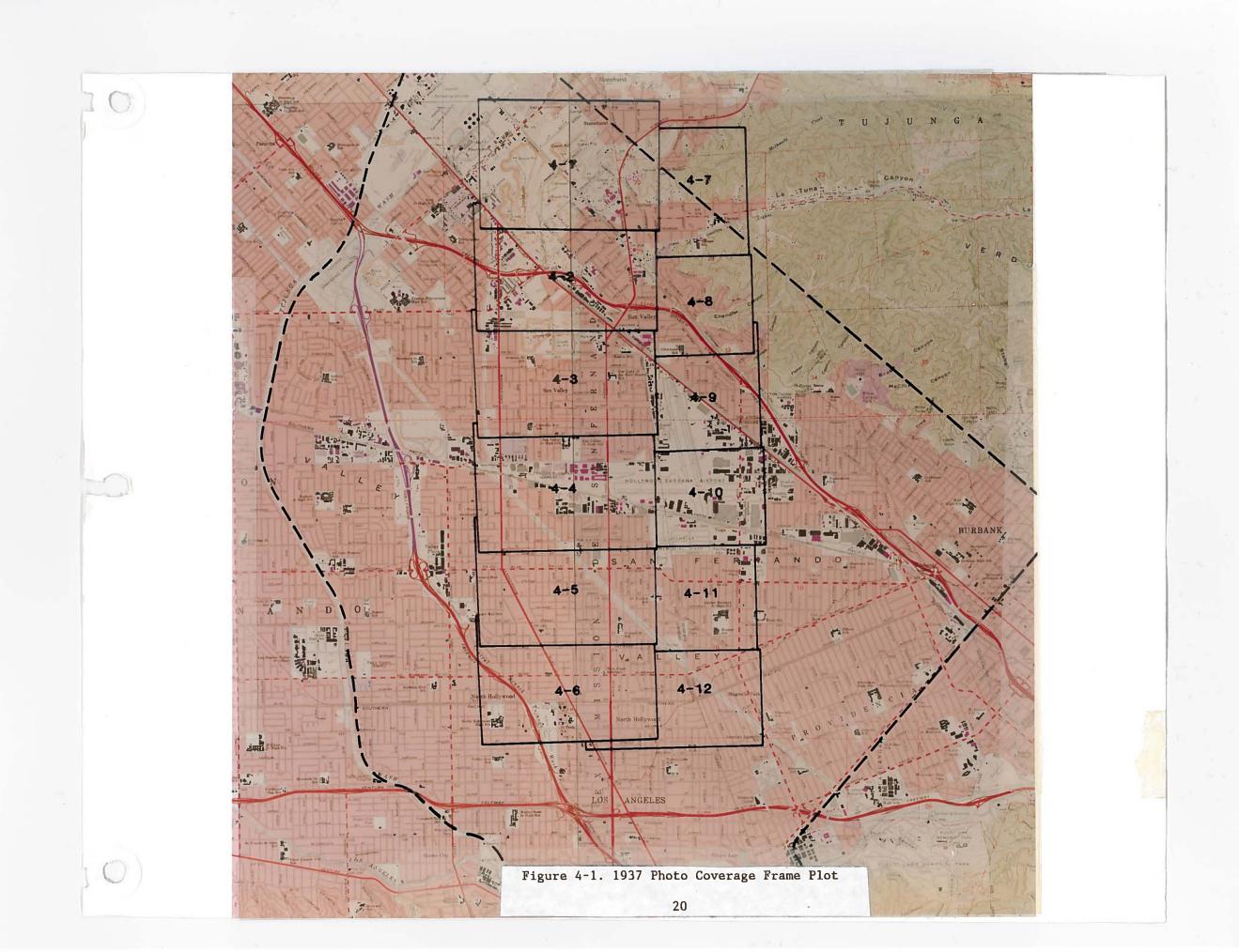
General Facility Type	Number	Observed
Gravel-Sand/Extraction-Processing		20
Fuel Distribution/Storage		2
Miscellaneous Waste Disposal Areas		3

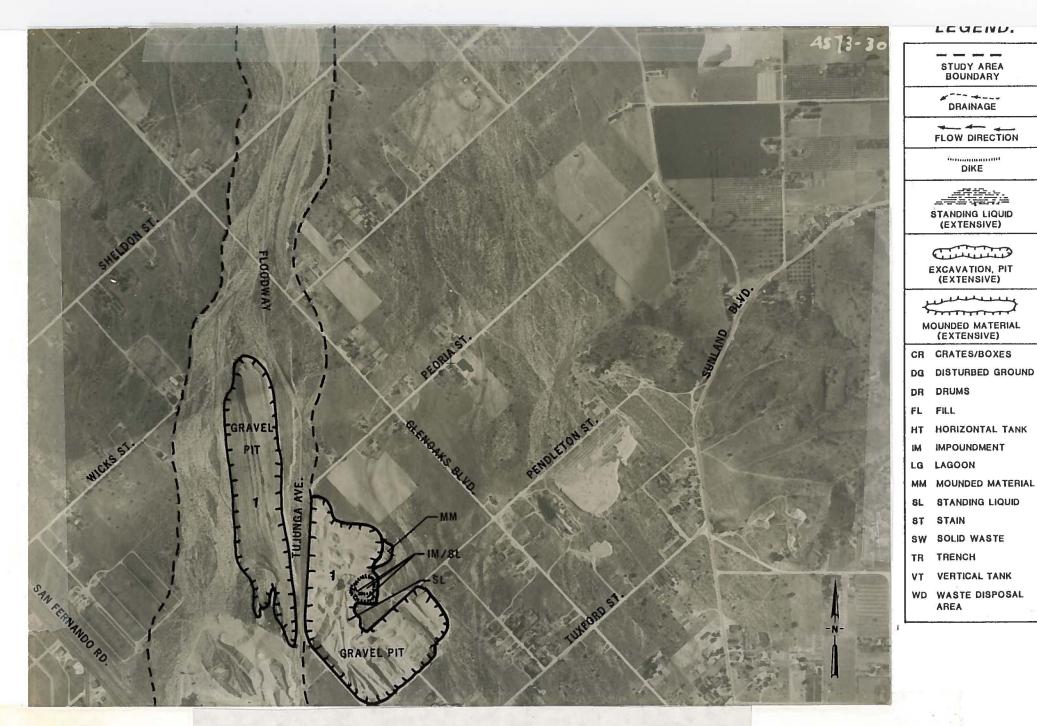
TABLE 4-1. POSSIBLE GROUND-WATER CONTAMINATION SOURCES IN THE EASTERN SAN FERNANDO VALLEY IN 1937

Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source		Description/Comment
4-1	Los Angeles	Glenoaks-Tujunga	1-Gravel Pits (2)	1 -	East pit clean; west pit contains impoundments with standing liquid (probable process wastewater); mounded, materials piled above west pit.
4-2	Los Angeles	San Fernando-Tuxford	1-Gravel Pit	1 -	Pit is clean; impoundment with standing liquid located above it.
		San Fernando-Tuxford	2-Gravel Pit	2 -	Area at north end of pit appears to contain solid waste.
		San Fernando-Tuxford	3-Gravel Pit	3 -	Pit center contains surface impoundment with standing liquid.
		San Fernando-Tuxford	4-Gravel Pit	4 -	Pit appears to be abandoned or incomplete.
4-3	Los Angeles	Tujunga-Strathern	1-Gravel Pit	1 -	Pit is clean; surface impoundment contains process waste wastewater.
L ₊ – L ₊	Los Angeles	Tujunga-Sherman	1-Gravel Pit	1 -	Pit is clean, appears to be inactive.
4-5	Los Angeles	Victory-Vineland	1-Gravel Pit	1 -	Pit contains standing liquid, appears to be inactive.
4-6	Los Angeles	Burbank-Colfax	1-Gravel Pit	1 -	Pit contains extensive standing liquid, appears to be inactive.
4-7	Los Angeles	Pendleton-Glenoaks	1-Gravel Pit	1 -	No visible sign of pollution.
		Pendleton-Glenoaks	2-Gravel Pit	2 -	Pit is abandoned, partially revegetated.
		Pendleton-Glenoaks	3-Gravel Pit	3 -	No visible sign of pollution.
		Sunland-Tuxford	4-Gravel Pits (5)	4 -	Pits excavated at base of Verdugo Mtns.; no visible sign of pollution.

TABLE 4-1. CONTINUED

Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment
4-8	Los Angeles	Strathern-San Fernando	ol-Fuel Distribution Facility	1 - Two uncontained vertical tanks are present.
4-9	Los Angeles	Clybourn-San Fernando	Tanks (2)	1 - Tanks are associated with a gas station.
	Burbank	Clybourn-Cohasset	2-Mounded Material	2 - Material appears to be sand/gravel stockpiles.
		Clybourn-Cohasset	3-Gravel Pit	3 - Pit is clean.
4-10	Burbank	Clybourn-Empire	1-Mounded Materials	1 - Materials are located behind unidentified commercial facility; appear to be combination of solid waste and clean fill.
		Empire-Hollywood Way	2-Pit	2 - Pit appears to be on Burbank-Union Airport property.
4-11	Los Angeles/ Burbank	-	None Observed	-
4-12	Los Angeles	Hatteras-Clybourn	1-Trench	1 - Feature recently excavated, no visible waste disposal.





LEGENU.

STUDY AREA BOUNDARY

DRAINAGE

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

FLOW DIRECTION

Photograph 4-1. 1937. Approximate Scale, 1 inch equals 1,000 feet.



Photograph 4-2. 1937. Approximate Scale, 1 inch equals 1,000 feet.

LEGENU:

STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

L FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

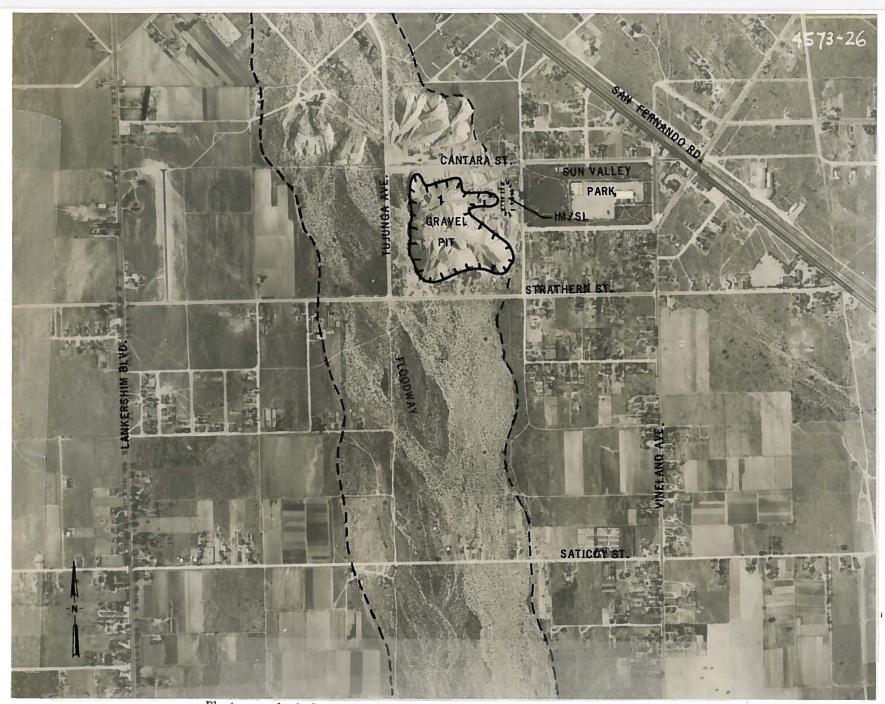
ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK

WD WASTE DISPOSAL AREA



Photograph 4-3. 1937. Approximate Scale, 1 inch equals 1,000 feet.

STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

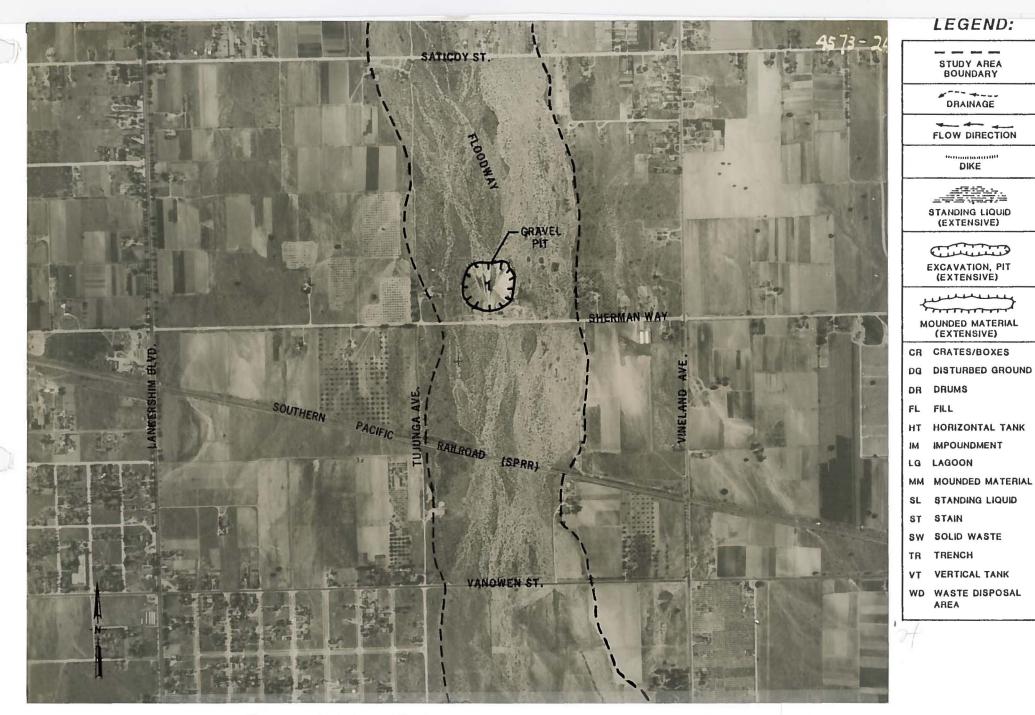
ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK

WD WASTE DISPOSAL AREA



LEGEND:

STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

the state of the s MOUNDED MATERIAL (EXTENSIVE)

IMPOUNDMENT

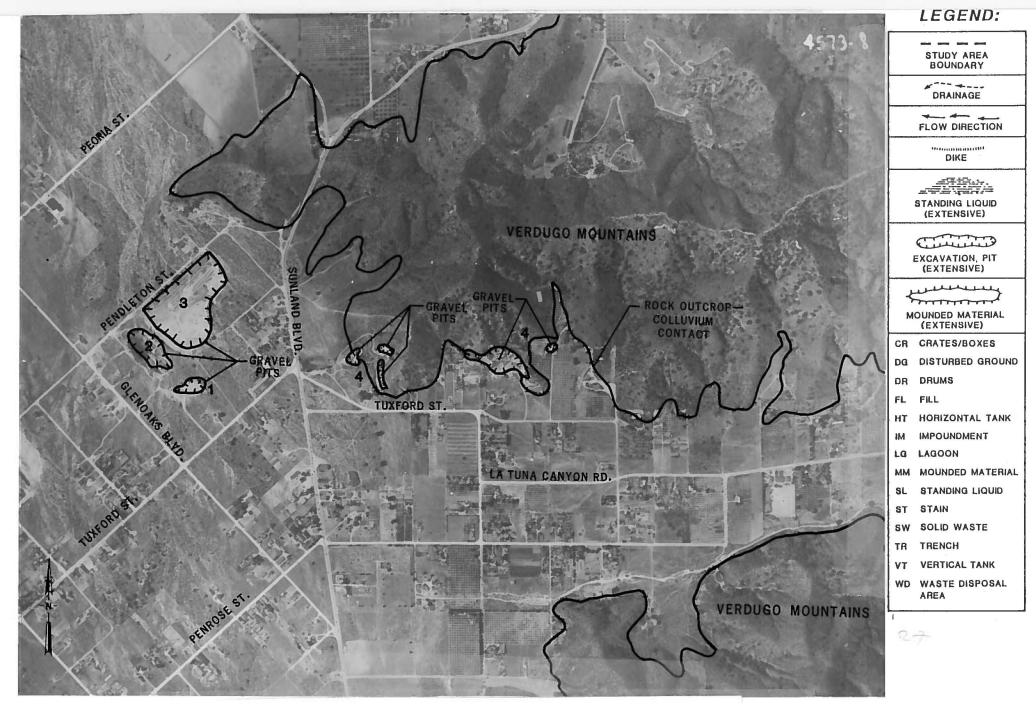
Photograph 4-4. 1937. Approximate Scale, 1 inch equals 1,000 feet.



Photograph 4-5. 1937. Approximate Scale, 1 inch equals 1,000 feet.



Photograph 4-6. 1937. Approximate Scale, 1 inch equals 1,000 feet.



Photograph 4-7. 1937. Approximate scale, 1 inch equals 1,000 feet.



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

Circums EXCAVATION, PIT (EXTENSIVE)

the state of the s MOUNDED MATERIAL (EXTENSIVE)

Photograph 4-8. 1937. Approximate scale, 1 inch equals 1,000 feet.



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

Photograph 4-9. 1937. Approximate scale, 1 inch equals 1,000 feet.



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID
(EXTENSIVE)

Cillians EXCAVATION, PIT (EXTENSIVE)

the same of the sa

MOUNDED MATERIAL (EXTENSIVE)

Photograph 4-10. 1937. Approximate scale, 1 inch equals 1,000 feet.



LEGENU.

STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

Photograph 4-11. 1937. Approximate scale, 1 inch equals 1,000 feet.



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

the state of the s MOUNDED MATERIAL (EXTENSIVE)

Photograph 4-12. 1937. Approximate scale, 1 inch equals 1,000 feet.

5.0 1941 AERIAL PHOTOGRAPHIC DATA ANALYSIS

5.1 Summary of Observations for 1941

The 1941 aerial data are of extremely high quality and usefulness. The images were acquired at a very large scale (1 inch on the photograph equals about 400 feet on the ground), and have excellent contrast and sharpness. Because of the scale (high spatial resolution) most of the ground features associated with possible ground-water pollution were readily identified. Because of the contrast (high spectral resolution), these features could be identified and characterized with high confidence.

Aerial data from 1941 were available only for the eastern one-third of the study area. Much of this area is today primarily residential. Because of the large number of images required to cover this area, only those photographic frames containing clear evidence of possible contamination sources are presented. This approach limits the amount of data that must be handled and analyzed, but ensures that major potential sources of ground-water contamination are identified.

The 1941 aerial data cover three main areas: (1) the San Fernando Road corridor from Olive Avenue in Burbank to Wicks Street in Sun Valley, (2) the Hollywood-Burbank airport area, and (3) the gravel pit complex between Glenoaks Boulevard and San Fernando Road in Stonehurst.

In 1941, explosive urban growth began in the San Fernando Valley. Much of the land that was in agricultural use in 1937 had been converted to residential, commercial, and industrial use by 1941. However, substantial quantities of undeveloped and agricultural land remained. In terms of the development of observable ground-water pollution sources, the following pattern was generally observed. A zone of lightly industrialized land was located along the Southern Pacific railroad and Verdugo Avenue to Burbank Boulevard. This area contained many drum storage yards, industrial liquid storage tanks, and solid waste piles. The area around the Hollywood-Burbank airport (then the Burbank-Union airport) was dominated by very large aircraft manufacturing and support facilities, all of which stored drummed wastes in the open. One active dump site was observed on the property of an aircraft plant, and one gravel pit near the Burbank airport was actively being used for solid waste disposal. North along San Fernando Boulevard, the quantity and concentration of possible pollution sources diminished. North of Tujunga Avenue, a large gravel pit complex was the most conspicuous possible pollution source. Although, most of the pits do not appear to have been used for waste dumping, at least one was being actively used for large-scale solid waste disposal. Most pits held standing liquids which are presumed to have been process wastewater, although the possibility of liquid waste disposal cannot be discounted.



The following is a breakdown of observed possible ground-water contamination sources by industrial activity for the 1941 aerial imagery:

General Facility Type	Number Observed
Fuel Distribution/Storage	7
Miscellaneous Manufacturing	8
Lumber Storage/Processing	3
Electricity Generation	1
Petrochemical Processing/Storage/Distribution	3
Aircraft Manufacturing/Support	8
Agricultural/Livestock	2
Gravel-Sand Extraction/Processing	9
Industrial Liquid Storage-Drum Storage	2
Miscellaneous Waste Disposal Areas	8

In compiling these totals, some contamination sources listed as functionally distinct in Table 5-1 were combined for inclusion in the more generalized categories outlined above.

TABLE 5-1. POSSIBLE GROUND-WATER CONTAMINATION SOURCES IN THE EASTERN SAN FERNANDO VALLEY IN 1941

Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1937	
5-1	Burbank	lst & Cedar	1-Waste Disposal Area	1-Area appears to have received solid and semisolid (wet solid) wastes. Extensive ground stains present.	1-1937 Photocoverage Unavailable	
	Burbank	Providencia & Flower	2-Fuel Distribution Facility	2-Four uncontained vertical tanks and approx. 500 55-gallon drums on site	=	
	Burbank	Verdugo & Flower	3-Unidentified Industrial Facility	3-Manufacturing treating facility using thermal process; approx. 220 55-gallon drums on site.	3-1937 Photocoverage Unavailable	
	Burbank	Olive & Flower	4-Petrochemical Processing Storage/Distribution Facility	4-On site are 36 vertical storage tanks, approx. 50 55-gallon drums, a solid waste pile, trench, and ground stains.	4-1937 Photocoverage Unavailable	
	Burbank	Verdugo & 1st	5-Fuel Distribution Facility	5-On site are 4 contained vertical storage tanks.	5-1937 Photocoverage Unavailable	
	Burbank	Olive & 1st	6-Lumber Processing Facility	6-No visible pollution signs.	6-1937 Photocoverage Unavailable	
	Burbank	Olive & Flower	7-Fuel Distribution Facility	7-On site are 4 contained vertical storage tanks and 20 55-gallon drum	7-1937 Photocoverage Unavailable s.	
	Burbank	Olive & Lake	8-Light Manufacturing Facility	8-Approx. 30 55-gallon drums stored in open; extensive ground stains associated with storage area.	8-1937 Photocoverage Unavailable	
	Burbank	Lake & Magnolia	9-Electrical Generating Facility		9-1937 Photocoverage Unavailable	
	Burbank	San Fernando & Cedar	10-Light Manufacturing Facility	10-Approx. 20 55-gallon drums stored in open on west side.	10-1937 Photocoverage Unavailable	
	Burbank	Flower & Olive	11-Concrete Fabrication and Storage Facility	11-Discharge from two horizontal storage tanks reaches Burbank Western Channel.	11-1937 Photocoverage Unavailable	
,	Burbank	Flower & Olive to Verdugo	12-Waste Disposal/Fill Dumping Area	12-Area has received earthen mate- rial and extensive dumping of oth solids including probable municip wastes and refuse.	er	
5-2	Burbank	Magnolia & Victory	1-Light Manufacturing Facility	1-On site are ground stains, a solid waste pile, and 10 55-gallon drums.	1-1937 Photocoverage Unavailable	
	Burbank	Magnolia & Victory	2-Lumber Yard	2-On site are approx. 10 55-galion drums.	2-1937 Photocoverage Unavailable	
	Burbank	Chestnut & Victory	3-Light Manufacturing Facility	waste pile.	3-1937 Photocoverage Unavailable	
	Burbank	Lake & Chestnut	4-Fuel Distribution	4-On site are 4 uncontained vertical tanks.		
	Burbank	Victory & Burbank	5-Lumber Yard	5-No visible pollution signs.	5-1937 Photocoverage Unavailable	

TABLE 5-1. CONTINUED

			TABLE 3	1. CONTINUED	
Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1937
2	Burbank	Lake & Burbank	6-Petrochemical Processing Facility	6-On site is a large, open-topped, tank-like surface impoundment containing dark-colored liquid. There are approx. 150 55-gallon drums stored in the open. Ground stains and a liquid waste stream discharge into Burbank Western Channel are present.	6-1937 Photocoverage Unavailable
	Burbank	Cypress & Bonnywood	7-Light Manufacturing Facility	7-On site are three vertical storage tanks and ten 55-gallon drums.	7-1937 Photocoverage Unavailable
	Burbank	San Jose & Bonnywood	8-Light Manufacturing Facility	8-Two piles of very light-toned waste piled adjacent to facility.	8-1937 Photocoverage Unavailable
5-3	Burbank	Victory Pl. & Empire	1-Aircraft Manufacturing Facility	500 55-gallon drums, a solid waste pile, a waste disposal area, and a trench containing standing liquid; short road-spur extends from the paved area into the waste disposal area; extensive ground stains are associated with the entire area. An area of earthen filling is locate southeast of this disposal area. Fill material is mostly clean except for slight darkening at east end. B-This area contains approx. 50 55-gallon drums, areas of standing liquid and ground stains. C-A highly concentrated area of cratemetallic wastes, refuse, 55-gallon drums, fabrication material, pipe, and other manufacturing-related objects (not separable by photo annotation).	ed 5,
	Burbank	Victory Pl. & Empire	2-Aircraft Manufacturing Facility	2-On site are approx. 80 uncontained industrial liquid storage tanks.	2 173, Filococoverago unavarrable
5-4	Burbank	Buena Vista & Empire	None Observed	-	-
5-5	Burbank	Ontario & Winona	1-Waste Disposal Area	1-Site appears to be used for clean fill dumping.	1-1937 Photocoverage Unavailable
	Burbank	Ontario & San Fernando	2-Aircraft Manufacturing Support Facility	W size was harry to be a second of	2-1937 Photocoverage Unavailable

TABLE 5-1. CONTINUED

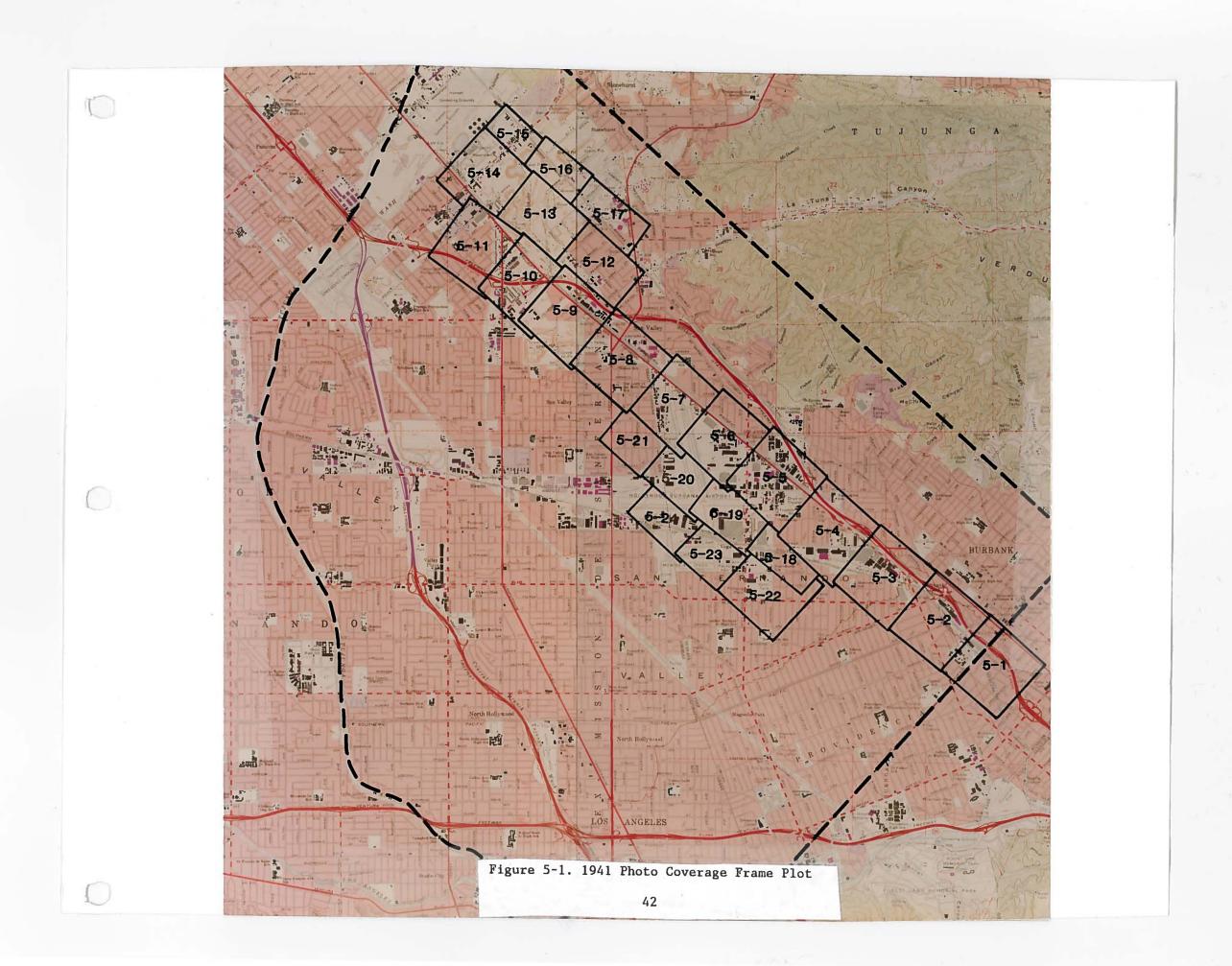
Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1937
	Burbank	Hollywood Way & San Fernando	3-Lumber Yard	3-No visible pollution signs.	3-1937 Photocoverage Unavailable
5-6	Burbank	Hollywood Way & San Fernando	1-Waste Disposal/Fill Dumping Area	1-Area appears to be inactive/ abandoned.	1-Area in agriculture in 1937.
5-7	Los Angeles	Arminta & San Fernando	1-Waste Disposal Area	1-Area contains mostly scrap wood, some dark-toned nonwood waste also present.	1-Area in agriculture in 1937.
5-8	Los Angeles	Clybourn & San Fernando	1-Fuel Distribution Facility	1-On site are approx. 35 55-gallon drums, mounded earthen material, and three contained vertical storage tanks.	1-Site present in 1937 with two vertical storage tanks.
	Los Angeles	Cantara & Sunland	2-Agricultural Processing Facility	2-No visible signs of pollution.	2-Site has expanded since 1937.
Los Angeles	Los Angeles	Ratner & San Fernando	3-Drum Storage Yard	3-Approx. 200 55-gallon drums stored in open.	3-Site was residential in 1937.
	Los Angeles	Stagg & Vineland	4-Waste Disposal Area	4-On site are approx. 200 drums, a filled area that includes some mounded material, and ground stains.	4-Site was mostly agricultural in 1937.
5-9	Los Angeles	Cantara & Tujunga	1-Gravel Pits(2)	1-North pit contains two surface impoundments with standing liquid (probable process wastewater); south pit contains two areas of standing liquid; two impoundments with probable process wastewater are located above it.	1-Both pits have expanded since 1937, more standing liquid present in 1941.
5-10	Los Angeles	San Fernando & Tuxford	1-Gravel Pit	1-Pit contains extensive standing liquid areas; an additional impound ment with standing liquid is locate above pit. All areas are probably process wastewater discharge; one vertical storage tank and ground stains also present.	
	Los Angeles	San Fernando & Tuxford	2-Gravel Pit	2-Area contains two impoundments with standing liquid, a separate stand- ing liquid area and a trench (no waste observed in trench).	2-Pit present in 1937, no waste sources observed.
5-11	Los Angeles	San Fernando & Lankershim	1-Industrial Storage Facility	1-On site are approx. 60 55-gallon drums.	1-Facility developed since 1937.

TABLE 5-1. CONTINUED

TABLE 5-1. CONTINUED					
Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1937
5-12	Los Angeles	San Fernando & Tuxford	1-Gravel Pit	1-Facility is a gravel processing; site around the site are areas of ground staining and standing liquid; also present are 30 55- gallon drums, three horizontal storage tanks and a trench.	1-Facility present in 1937 without drums, stains, or tanks.
5-13	Los Angeles	San Fernando/Tuxford & Tujunga/Bradley	1-Gravel Pit Complex (cont'd from Photo.5-12)	A-Site covers an extensive area between San Fernando and Bradley and consists of a pit, rock crusher-conveyer, and rail spurs; large area of standing liquid discharaged from crusher to onsite pond; also visible is a waste disposal dump with ground stains apparent and approx. 25 55-gallon drums stored in open; also present is an elongated surface impoundment containing standing liquid and an open trench; no evidence of dumping into pit.	
				B-A continuation of pit A, contains a crusher-conveyor and areas of standing liquid and ground stains; no evidence of dumping into pit. Continued on photograph 5-14.	B-Site developed since 1937.
				C-No evidence of dumping into pit.	C-Site present in 1937 but deepened, expanded by 1941.
				D-Site contains a crusher-conveyor, no evidence of dumping into pit.	D-Site present in 1937 but deepened by 1941; impoundments observed in 1937 no longer present. E-Pit containing wastes present
				disposal area; visible is dark- toned solid waste material (probabl refuse); also present are approx. 300 55-gallon drums staged for disposal.	in 1937, but deepened by 1941.
5-14	Los Angeles	Wicks & Ralston	1-Gravel Pit Complex (cont'd from Photo 5-13)	_	B-Site developed since 1937.

TABLE 5-1. CONTINUED

Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1937
5-15	Los Angeles	Between Wicks & Sheldon, N. of Bradley	1-Livestock Processing Facility	1-Located around perimeter of site are mounded materials, a solid waste pile, and a trench containing standing liquid.	1-Site present in 1937 with no visible pollution evident. B
		•			
5-16	Los Angeles	Glenoaks & Peoria	1-Gravel Pit	1-No visible sign of pollution in pit.	1-Pit excavated since 1937; site originally in agricultural land use.
			2-Gravel Pit	2-No visible sign of pollution in pit.	2-Pit present in 1937 with no visible pollution evident.
5-17	Los Angeles	Glenoaks & Pendleton	1-Gravel Pit	1-No visible sign of pollution in pit.	1-Pit present in 1937 with no evidence of dumping.
			2-Gravel Pit	2-Extensive solid waste dumping inside pit, appears to be	2-Dumping has occurred since 1937.
		*	3-Gravel Pit	municipal refuse and garbage. 3-No visible sign of pollution in pit.	3-Pit present in 1937 with no evidence of dumping.
5-18	Burbank	Buena Vista & Empire	1-Aircraft Manufacturing Facility	A-Area appears to be a storage/ warehouse area in support of AC manufacturing; present are three solid waste piles and approx. 20 55-gallon drums.	A-1937 Photocoverage Unavailable
				B-Solid waste disposal area assoc. with parking lot at extreme west end of plant; dumped materials are dark-toned, undifferentiated solids; drainage passes through dumping zone.	B-1937 Photocoverage Unavailable
5-19	Burbank	Hollywood & Empire	1-Fuel Storage Facility	1-On site are 10 uncontained vertical storage tanks.	1-Area in agriculture in 1937.
			2-Fuel Distribution Facility	2-On site are 6 contained vertical storage tanks.	2-Area in agriculture in 1937.
			3-Aircraft Manufacturing Plant	A-In this storage area are stacked crates, approx. 15 55-gallon drums.	A-Plant developed since 1937.
				B-This area contains a freshly excavated pit and a single vertical storage tank separated by an earther revetment; purpose of excavation is unknown.	B-Developed since 1937.





STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK

WD WASTE DISPOSAL



LEGENU:

STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

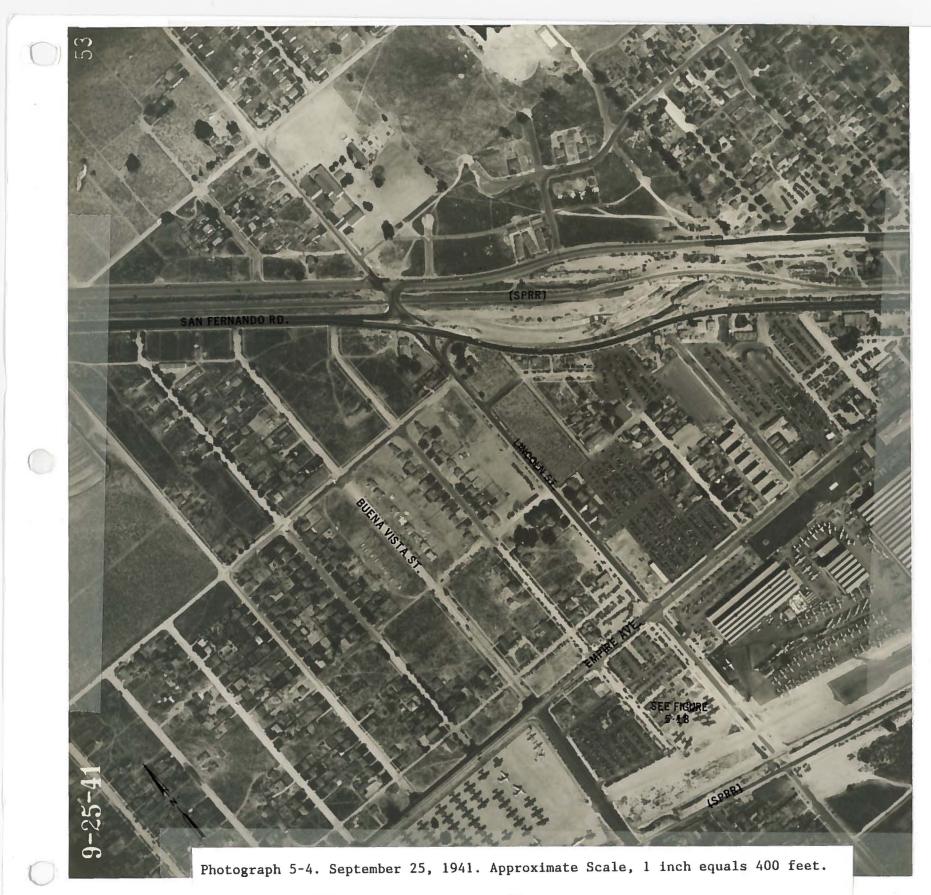
SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK



LEGLIND.

STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

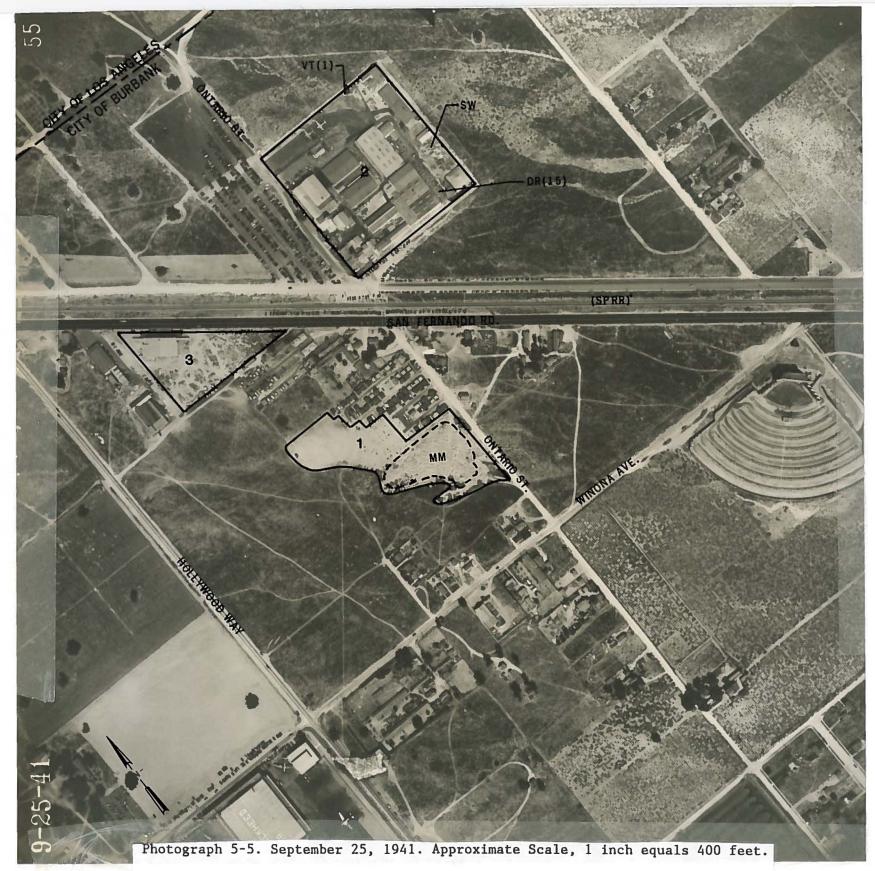
SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

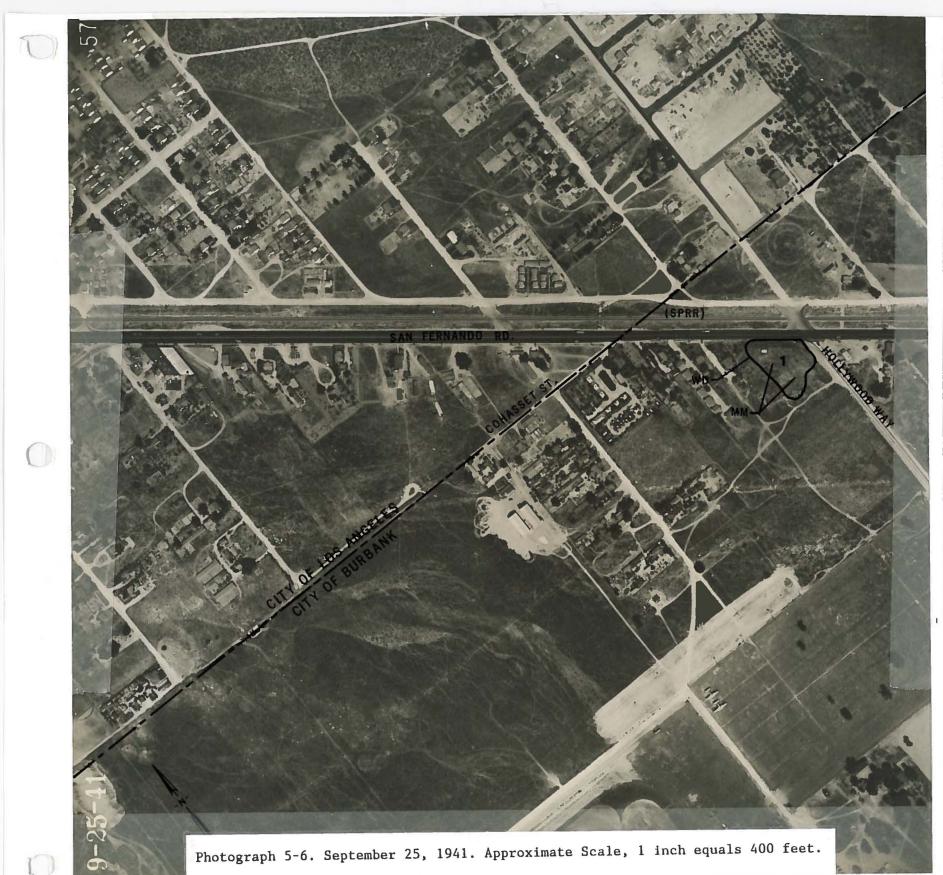
DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

- CR CRATES/BOXES
- DG DISTURBED GROUND
- DR DRUMS
- FL FILL
- HT HORIZONTAL TANK
- IM IMPOUNDMENT
- LG LAGOON
- MM MOUNDED MATERIAL
- SL STANDING LIQUID
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VT VERTICAL TANK
- WD WASTE DISPOSAL AREA



LEGENU.

STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

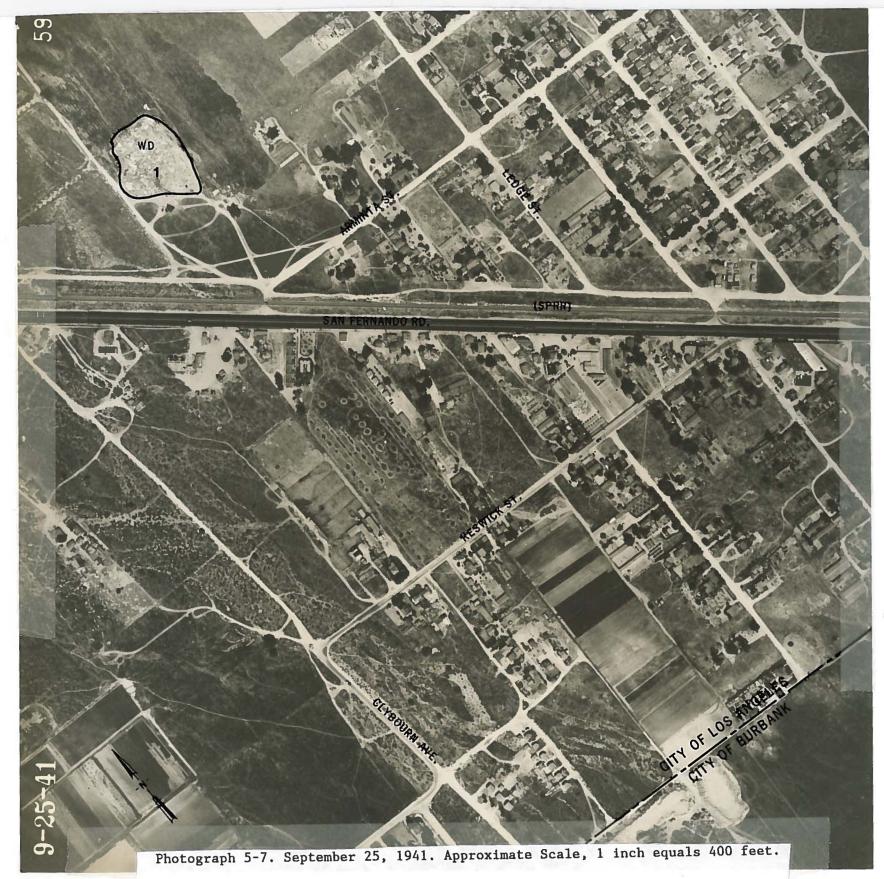
STANDING LIQUID
(EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

- CR CRATES/BOXES
- DG DISTURBED GROUND
- DR DRUMS
- FL FILL
- HT HORIZONTAL TANK
- IM IMPOUNDMENT
- LG LAGOON
- MM MOUNDED MATERIAL
- SL STANDING LIQUID
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VT VERTICAL TANK
- WD WASTE DISPOSAL AREA

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STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

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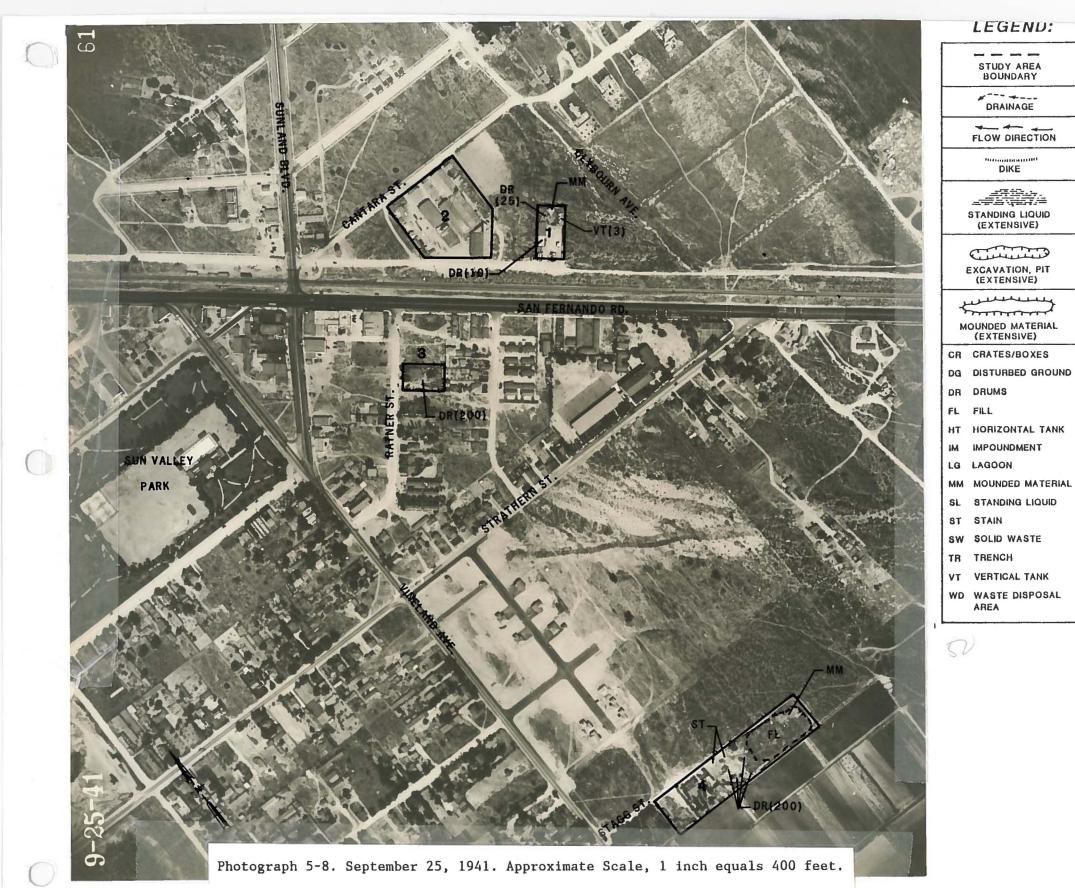
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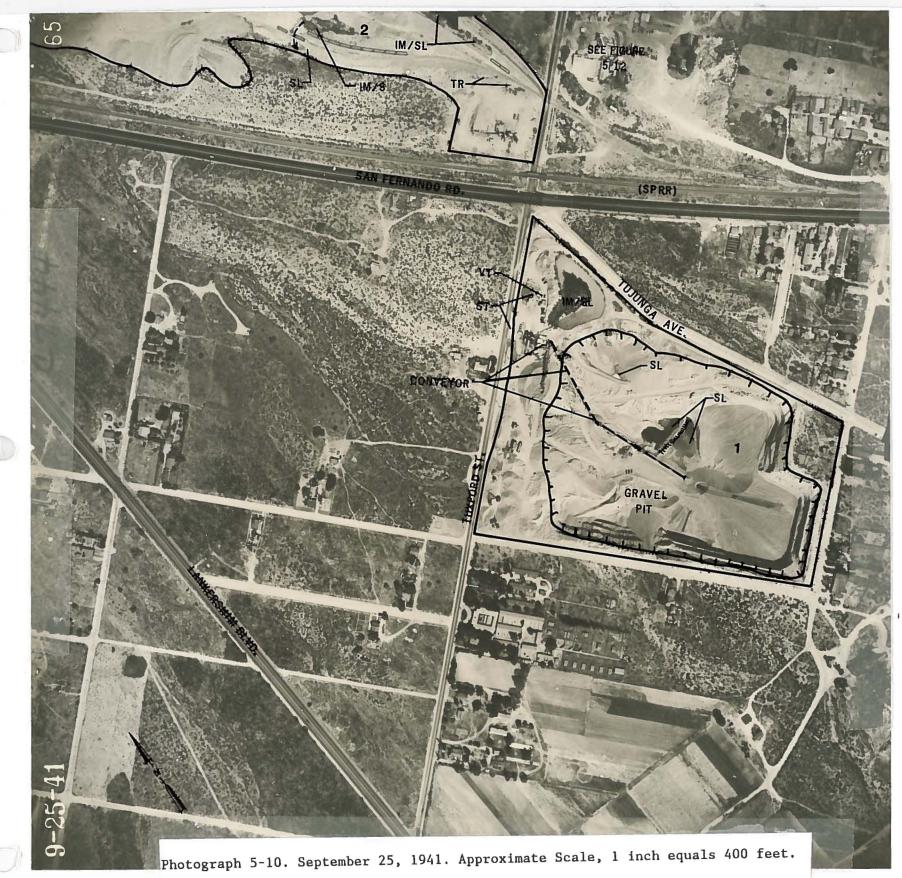
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STUDY AREA BOUNDARY

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STUDY AREA BOUNDARY

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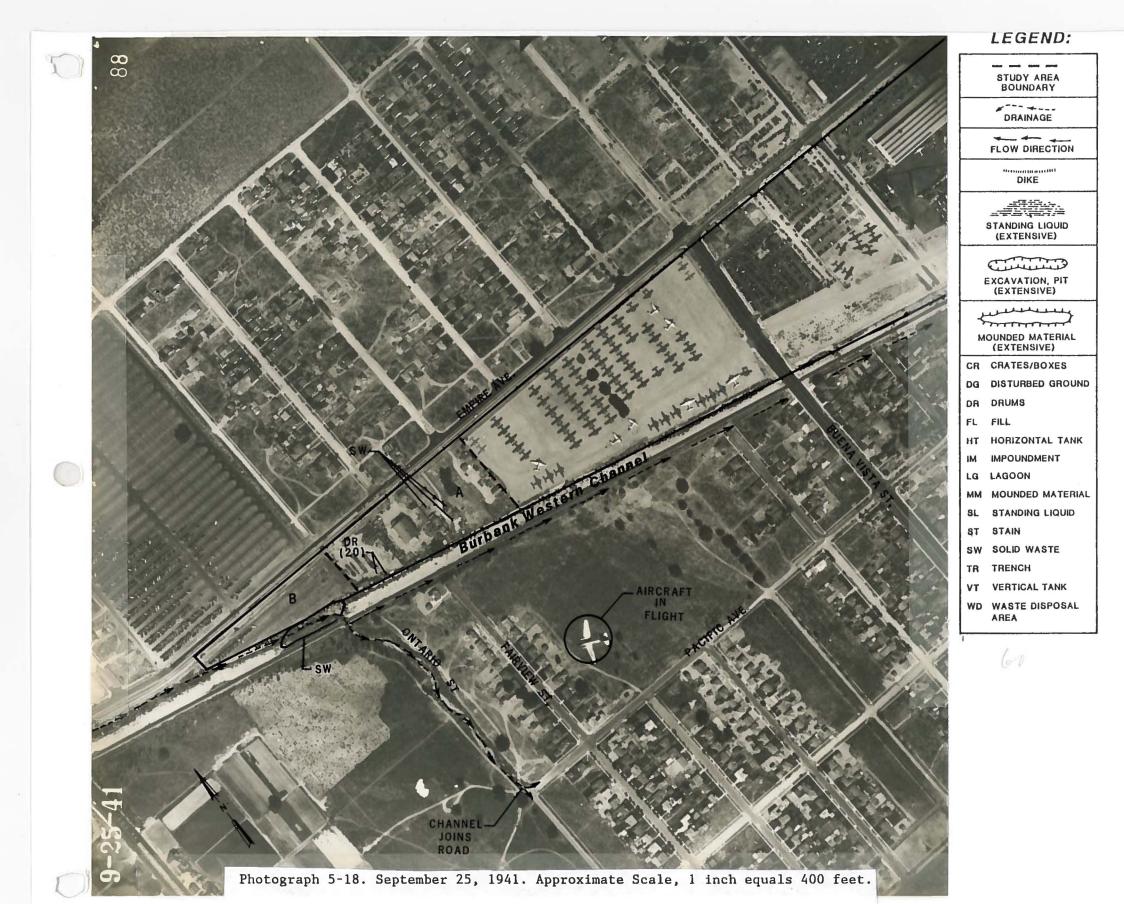
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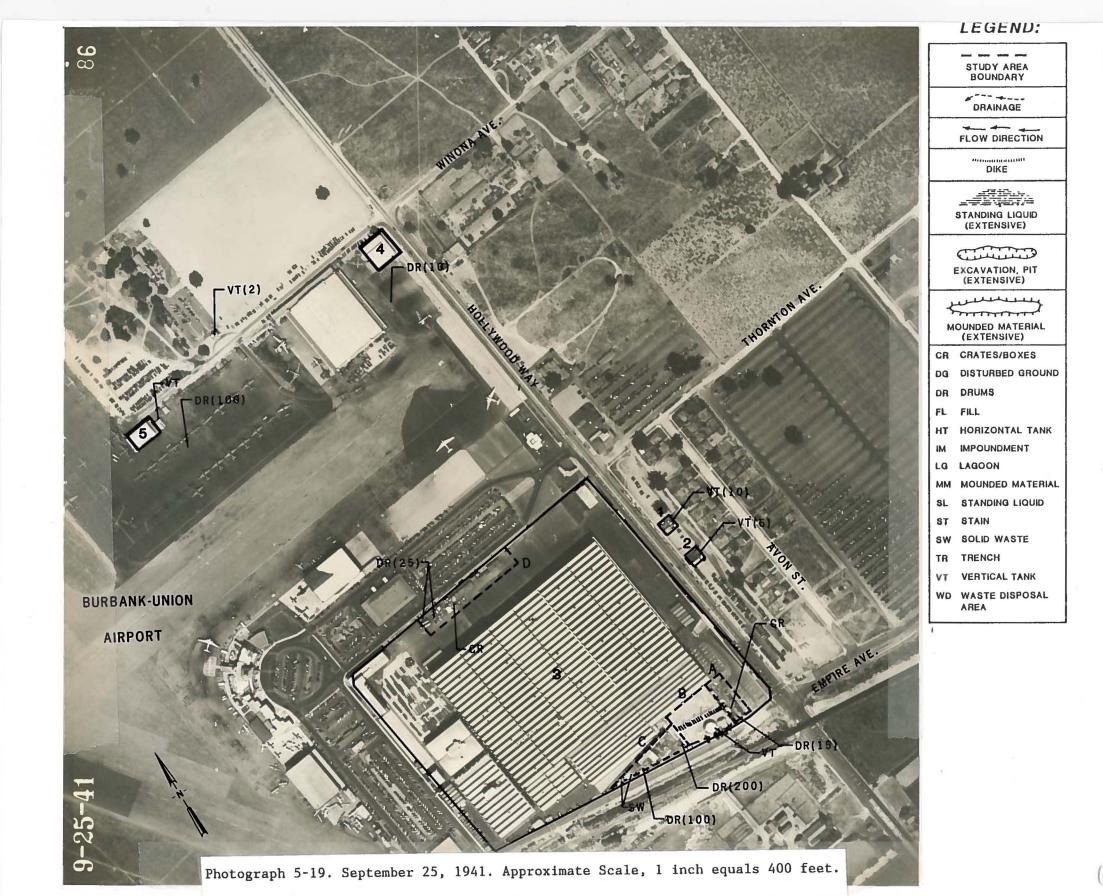
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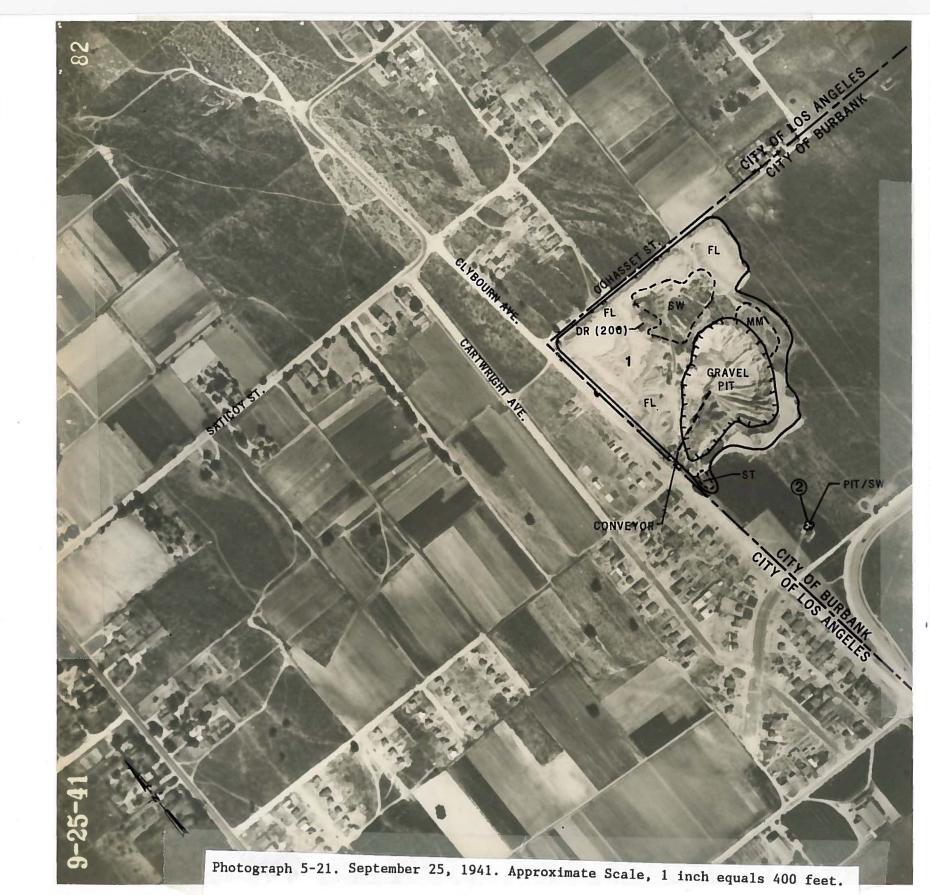
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- WD WASTE DISPOSAL AREA



STUDY AREA BOUNDARY

DRAINAGE

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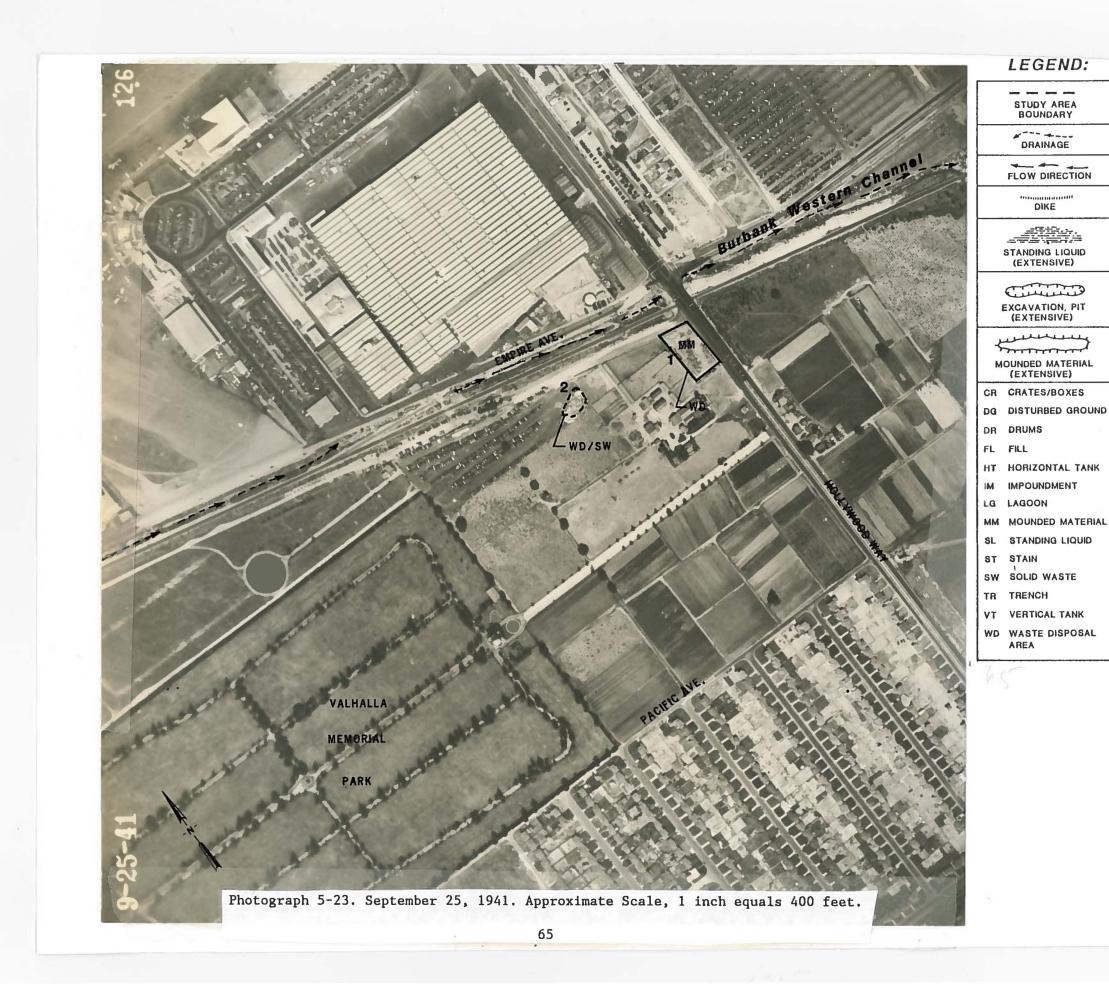
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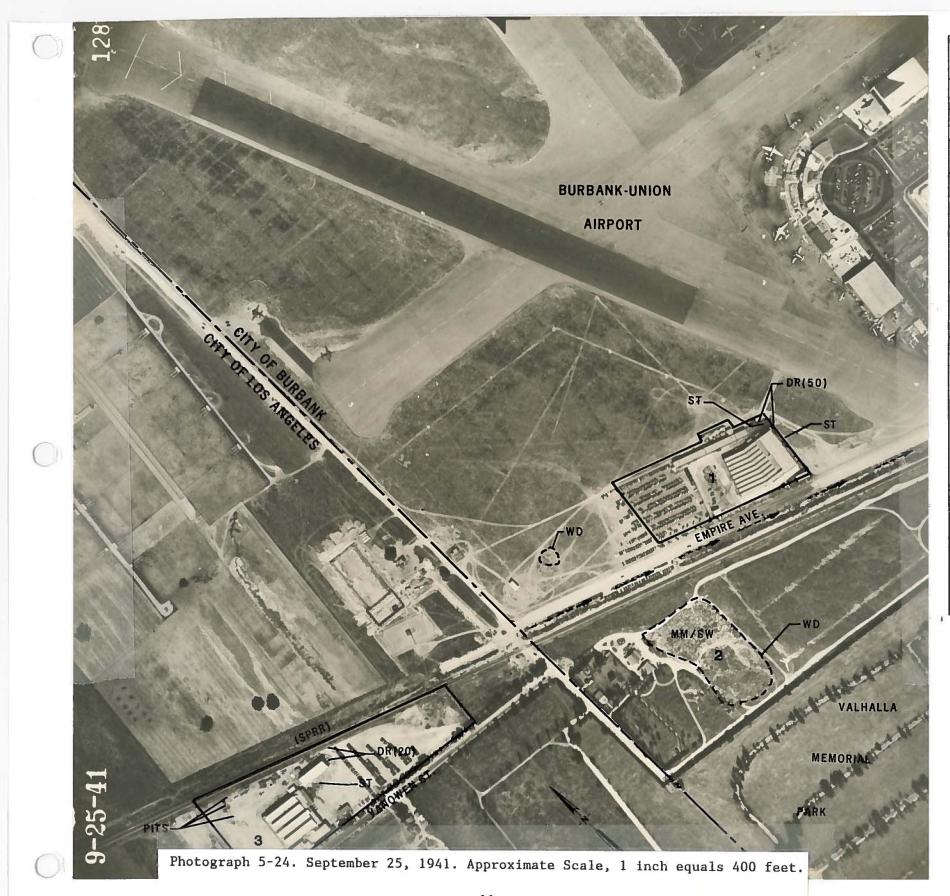
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- SL STANDING LIQUID
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- VT VERTICAL TANK
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STUDY AREA BOUNDARY

DRAINAGE

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6.0 1952 AERIAL PHOTOGRAPHIC DATA ANALYSIS

6.1 Summary of observations for 1952

The quality of the 1952 aerial photography is good. A slight vignetting effect uneven illumination is noticeable on most of the prints. The photography was acquired at a small scale (1 inch equals 2,000 feet on the ground). Due to small scale and limited spatial resolution only fairly large features could be identified, and many features clearly visible on the 1941 photography could not be annotated in 1952. Whenever possible, the large-scale 1941 photography was used to help identify facilities on the 1952 photographs.

The 1952 photography provided good coverage of most of the study area. Only images of areas south of Burbank Boulevard were not available.

The trend toward urbanization of the San Fernando Valley observed between 1937 and 1941 continued at a high level through 1952. Almost all of the study area had been converted from agricultural land to residential developments. Small agricultural plots remained in the western part of the study area, especially beyond the Central Branch Tujunga Wash. Generally, the pattern on industrial and commercial land observed in 1941 remained unchanged; however, significant new industrial and commercial activity was noted in the area of Hollywood Way east of the Hollywood/Burbank Airport. Much of this land had been undeveloped or was agricultural in 1941.

Several general areas of potential ground-water contamination were evident on the 1952 photography. The gravel pit complex located in the area of San Fernando Road and Lankershim Boulevard had been expanded since 1941. Continued dumping of solid waste was noted, as was an increase in the evidence of liquid waste disposal. Solid waste disposal continued to be evident at the gravel pit near the Hollywood-Burbank Airport. Numerous stains and several deposits of solid waste were also visible in other gravel pits within the study area.

The Hollywood-Burbank airport was another potential ground-water pollution area. Extensive dark-toned staining was visible in aircraft parking areas and among hangars. The extent of the staining showed a significant increase since 1941. A large spill was seen at an aircraft on the east-west runway. The amount of industrial activity at the airport had also increased since 1941.

A third potential pollution area noted on the 1952 imagery was the set of industrial facilities east of the airport. More than 20 industrial complexes were annotated in this area. Stains of various sources were visible at eight of these sites. Notable was the decrease in activity at the large aircraft manufacturing facility.

The Hansen and Tujunga spreading grounds are visible on the 1952 photography. No potential pollution sources are located near these grounds, and they appear to be free from any contamination.



The following is a breakdown of observed potential ground-water contamination sources for 1952. Due to the small scale of the photography only general facility types could be determined.

General Facility Type	Number Observed
Small Industrial Facilities Gravel Pit Complexes Aircraft Manufacturing Facilities	19 12 5
Dumps	2
Airports	1
Commercial Facilities	4
Utility Facilities	3

TABLE 6-1.	POSSIBLE	GROUND-WATER	CONTAMINATION	SOURCES	IN	THE	EASTERN	SAN	FERNANDO	VALLEY	IN 1952	2
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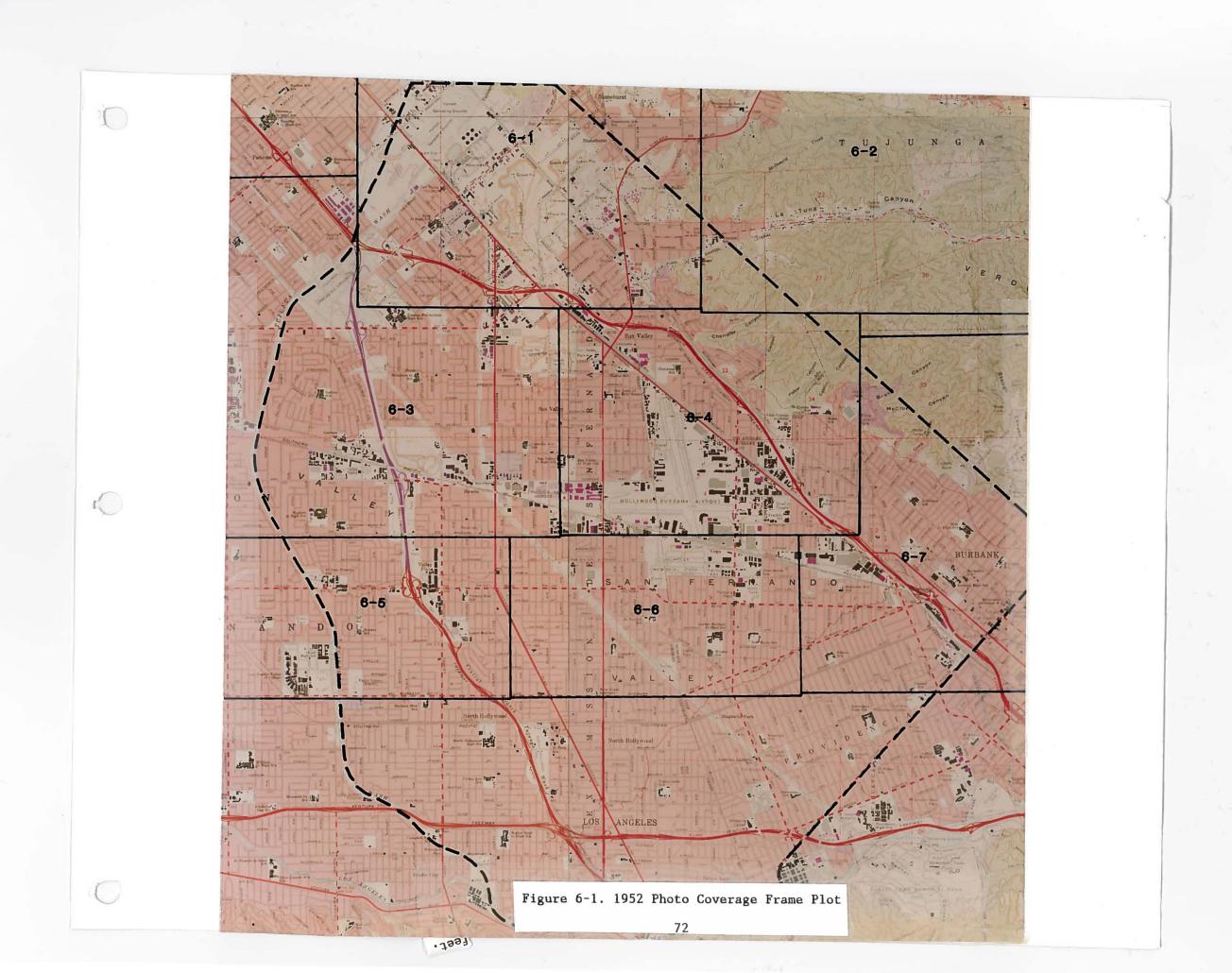
Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1941
				2.17	110/1 7
6-1	Los Angeles Los Angeles	San Fernando & Branford San Fernando & Truesdale		1-No visible evidence of pollution. 2-Staining	1-1941 Photocoverage Unavailable 2-1941 Photocoverage Unavailable
	Los Angeles	Glenoaks & Peoria	3-Gravel pit	3-No visible evidence of pollution.	3-Pit did not exist in 1941.
	Los Angeles	Glenoaks & Pendleton	4-Gravel pit	4-No visible evidence of pollution.	4-Waste disposal pit at "A" has been filled.
	Los Angeles	Glenoaks & Pendleton	5-Old gravel pit	5-No visible evidence of pollution.	5-Gravel pit filled in.
6-2	Los Angeles		None Observed		
6-3	Los Angeles	Roscoe & Sheldon	1-Tujunga spreading grounds	1-No visible evidence of pollution.	1-1941 Photocoverage Unavailable
	Los Angeles	Sheldon & Roscoe	2-Gravel pit	2-Standing liquid and staining are probably water. No threat to spreading grounds.	2-1941 Photocoverage Unavailable
	Los Angeles	Lankershim & Tuxford	3-Small commercial fac.	3-Heavy, dark-toned stains.	3-1941 Photocoverage Unavailable
	Los Angeles	Lankershim & Strathen	4-Small industrial fac.	4-Dark-toned stains and light-toned stains or residue.	4-1941 Photocoverage Unavailable
6-4	Los Angeles	San Fernando & Sheldon	1-Gravel extraction cmplx	1-Heavy, dark-toned stains probably from liquid waste disposal, and liquid waste visible in three unlined impoundments. Standing	1-Increase in liquid waste disposal.
		Oleman C. Deviller	0.0111	water accumulations.	0.0
	Los Angeles	Glenoaks & Pendleton	2-Gravel extraction cmplx		2-Continued gravel mining
	Los Angeles	Glenoaks & Pendleton	3-Waste disposal site	3-Solid waste disposal in the main pit.	3-Continued dumping in same area.
	Los Angeles	San Fernando & Tuxford	4-Small industrial fac.	4-Heavy staining in open area.	4-Similar staining in slightly different area.
	Los Angeles	Tujunga & San Fernando	5-Gravel pit	5-No visible evidence of pollution.	5-Conveyors removed and area appears inactive.
	Los Angeles	Tujunga & Strathern	6-Gravel extraction cmplx	6-Dark stains from spills in the northeast pit. Dark stains from dumping on edge of southeast pit.	6-Two new pits. First evidence of waste disposal.
	Los Angeles	San Fernando & Olinda	7-Small industrial fac.	7-Small spill stains in open storage area.	7-Site previously residential.
	Los Angeles	San Fernando & Clybourn	8-Small industrial fac.	8-No visible evidence of pollution.	8-1941 photocoverage Unavailable
6-5	Los Angeles	Raymer & Ethel	1-Small industrial fac.	1-One light and one dark-toned stain in an open area.	1-1941 photocoverage Unavailable
	Los Angeles	Laurel Canyon & Saticoy	2-Gravel pit	2-Dark-toned stains along road. No waste disposal at pit.	2-1941 photocoverage Unavailable
	Los Angeles	Laurel Canyon & Sherman	3-Small industrial fac.	3-No visible evidence of pollution.	3-1941 photocoverage Unavailable
	Los Angeles	Erwin & Laurel Canyon	4-Solid waste dump	4-Dumping of solid waste and refuse.	4-1941 photocoverage Unavailable

TABLE 6-1. CONTINUED

Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1941
6-6	Los Angeles	Lankershim & Sherman	1-Heavy industrial	1-Extensive spill stain from building	1-1941 photocoverage Unavailable
			manufacturing facility	on east side of the facility. Prob-	
				ably entered storm drainage system.	
				Staining in two other open areas at	
				the site.	
	Los Angeles	Tujunga & Sherman	2-Gravel pit	2-Extensive dark-toned areas at "A"; possible stains.	2-1941 photocoverage Unavailable
	Burbank	Clybourn & Saticoy	3-Gravel pit	3-Staining visible within the pit. Mounded solid waste and fill located north of the pit. Staining also south of the pit. A hose and discharge are at "B".	3-Expansion of plt; solid waste present.
	Burbank	Sherman & Clybourn	4-Hollywood-Burbank airport	4-Extensive staining areas are at "C" near hangars and parked aircraft. Heavy spillage from an aircraft is flowing east along the runway.	4-Increased staining throughout the facility.
	Burbank	San Fernando & Hollywood	5-Aircraft maintenance	5-Small deposits of solid waste in	5-Area previously agricultural.
			facility	open area. Large spill stain at building on east side of facility. Staining at parked aircraft.	
	Los Angeles	Hollywood & Thornton	6-Aircraft maintenance facility	6-Staining in open storage area on east side of facility.	6-Over 200 drums and solid waste previously visible on the southern edge of the site.
	Los Angeles	Vanowen & Clybourn	7-Aircraft support fac.	7-No visible evidence of pollution.	7-1941 photocoverage Unavailable
	Los Angeles	Hartland & Tujunga	8-Industrial facility	8-No visible evidence of pollution.	8-1941 photocoverage Unavailable
	Los Angeles	Victory & Vineland	9-Gravel pit	9-Staining and solid waste in the pit.	9-1941 photocoverage Unavailable
	Los Angeles	Clybourn and Burbank	10-Utility substation	10-No visible evidence of pollution, but numerous transformers.	10-1941 photocoverage Unavailable
6-7	Los Angeles	Glenoaks & Hollywood	1-Small commercial fac.	1-Dark-toned stains possibly from dumping.	1-1941 photocoverage Unavailable
	Burbank	Glenoaks & Cohasset	2-Industrial facility	2-Staining among equipment in open storage area.	2-Site previously undeveloped.
	Burbank	San Fernando & Ontario	3-Industrial manufacturing facility	3-Staining in open storage area.	3-Facility previously aircraft support. Solid waste and drums visible in 1941.
	Burbank	San Fernando & Naomi	4-Small industrial fac.	4-Dark stains apparently from dumping.	4-Site previously undeveloped.
	Burbank	San Fernando & Ontario	5-Small industrial fac.	5-Dark staining possibly from spills.	5-Site previously undeveloped.
	Burbank	San Fernando & Ontario	6-Small industrial fac.	6-No visible evidence of pollution.	6-Site previously undeveloped.
	Burbank	San Fernando & Naomi	7-Small industrial fac.	7-No visible evidence of pollution.	7-Site previously undeveloped.
	Burbank	San Fernando & Hollywood	8-Small industrial fac.	8-No visible evidence of pollution.	8-Site previously a lumber yard.
	Burbank	Ontario & Winona	9-Industrial facility	9-No visible evidence of pollution.	9-Facility under construction in 1941.
	Burbank	Ontario & Winona	10-Commercial/industrial complex	10-No visible evidence of pollution.	10-Site previously agricultural.

TABLE 6-1. CONTINUED

					
Photo-	Administrative		Potential	P 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
graph Number	Area	Cross Streets	Contamination Source	Description/Comment	Change from 1941
Mumber			<u> </u>		
-	Burbank	Pacific & Hollywood	11-Small industrial	11-One uncontained vertical tank.	11-Area previously undeveloped.
			facility	Disturbed ground nearby is result	
				of construction activity.	
	Burbank	San Fernando & Empire	12-Large aircraft	12-Light and dark-toned stains	12-Drums, solid waste, and
		•	manufacturing facility	visible at several points in open	The state of the s
				areas.	significant decrease in
					activity.
	Burbank	San Fernando & Burbank	13-Aircraft manufacturing	13-No visible evidence of pollution.	
			support facility	to no visible evidence of portation.	
	Burbank	Magnolia & Burbank	14-Small industrial	1/-On cita and 15 wanting1 tanks -11	longer visible.
		Western Channel	facility	14-On site are 15 vertical tanks all	14-Area previously undeveloped.
		, and the same of	ractificy	uncontained. Spill threat to	
	Burbank	01/ 5 P		Burbank Western Channel.	
		Olive & Burbank Western	15-Power plant complex	15-Three uncontained vertical tanks.	15-Facility under construction in
		Channel Channel			1941.
	Burbank	Olive & Burbank Western	16-Small industrial	16-Three uncontained vertical tanks	16-No change since 1941.
		Channe 1	facility	on edge of Burbank Western Channel	
	Burbank	Bel Aire & Bethany	17-New residential	17-No visible evidence of pollution.	
			development	2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	





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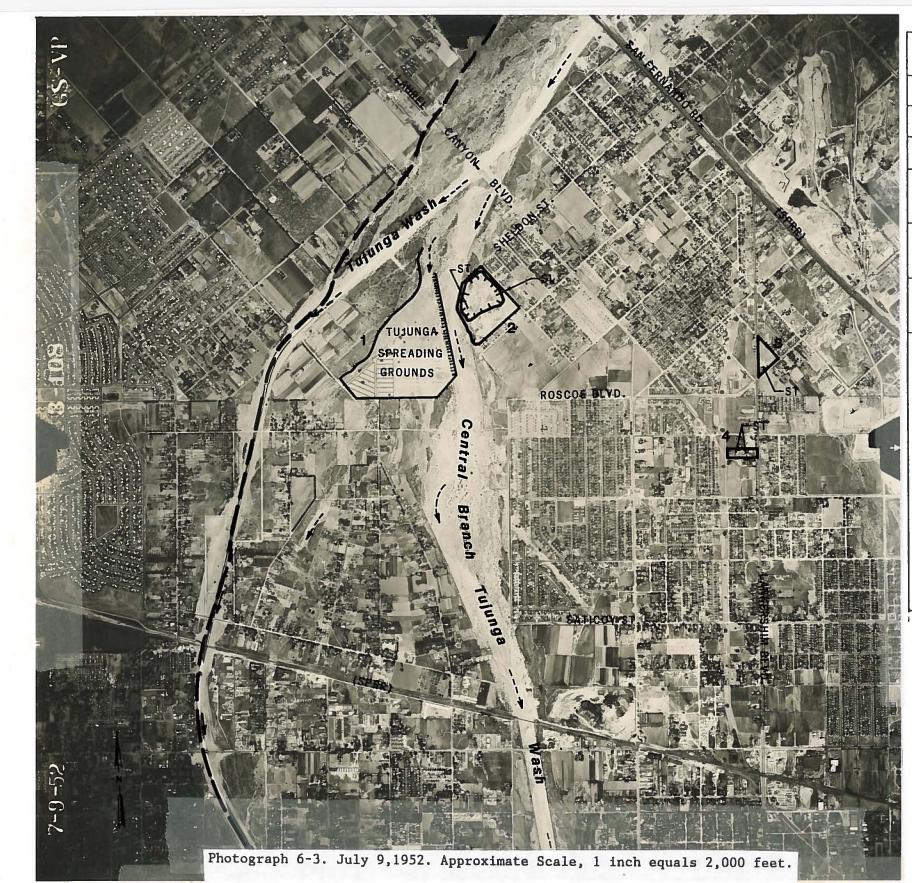
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VICTORY BLVD. Photograph 6-4. July 9,1952. Approximate Scale, 1 inch equals 2,000 feet.

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VERDUGO MOUNTAINS Photograph 6-5. July 9,1952. Approximate Scale, 1 inch equals 2,000 feet.

LEGEND:

STUDY AREA BOUNDARY

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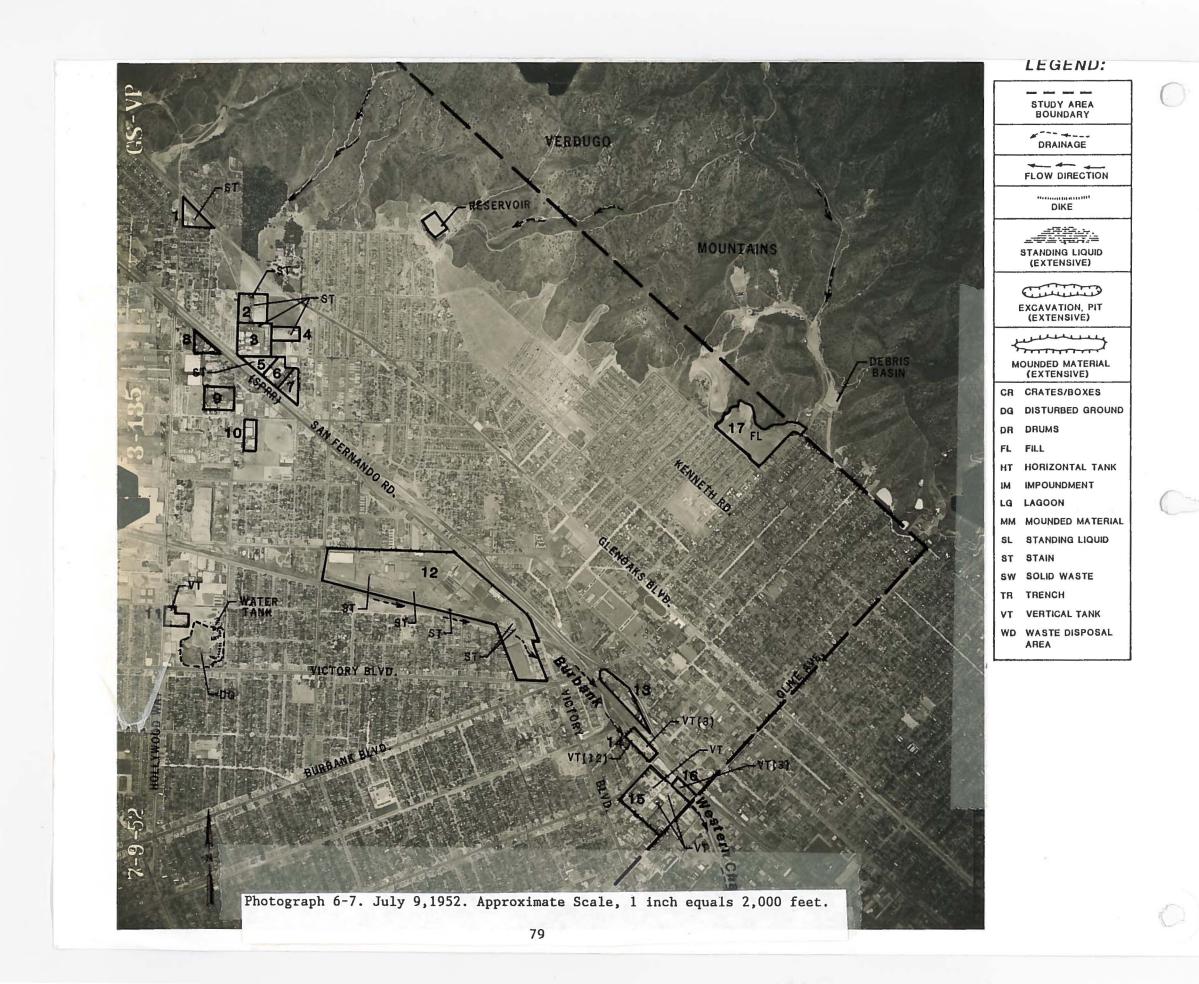
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7.0 1953-1954 AERIAL PHOTOGRAPHIC DATA ANALYSIS

7.1 Summary of Observations for 1953-1954

The 1953-1954 photography is of good quality. Vignetting effects observed on the 1952 photography are also evident on the 1953 and 1954 photography but to a lesser degree. The scale of the photography (1 inch equals 1,660 feet) is larger than on the 1953 images and allows a slightly more detailed analysis; however, only general facility types remain identifiable. A combination of 1953 and 1954 photography was used to provide complete coverage of the study area; the 1953 photos cover the western edge of the area and the 1954 photos cover the east.

Generally, few changes from 1952 were evident in the study area. Small parcels of agricultural land remained present in the western part of the study area. The pattern of industrial and commercial activity was unchanged.

The number of potential ground-water contamination sites in the valley had increased somewhat over 1952, as had disposal of solid and liquid waste at the gravel pit complex at San Fernando Road and Lankershim Boulevard. New impoundments, stains, and solid waste deposits were noted in the pits. Dumping of large crates was visible in one of the gravel pits. A small landfill with solid waste was present in a gravel pit at Victory Boulevard and Vineland Avenue. At a third gravel pit complex, one large pit had been filled-in, apparently by landfilling of solid waste.

The amount of staining and spillage at the Hollywood-Burbank airport decreased slightly in 1954; however, significant staining was still associated with parked aircraft. Staining and a spill were visible at 4 of the 14 industrial/commercial facilities east of the airport. Further east, at the edge of the study area, 15 uncontained vertical storage tanks are located in close proximity to the Burbank Western Channel. These tanks posed a spill threat to the channel.

Several industrial/commercial facilities were noted along Chandler Boulevard. Small amounts of staining were visible at two of these.

No significant change was observed at the Hansen and Tujunga spreading grounds. These areas remained free from encroaching potential pollution sources and showed no evidence of contamination.

The following is a breakdown of observed potential ground-water contamination sources for 1953-1954.

General Facility Type	Number	Observed
Small Industrial Facilities		28
Gravel Pit Complexes		11
Aircraft Manufacturing Facilities		5
Dumps		3
Airports		1
Commercial Facilities		6
Utility Facilities		3
Chemical Facilities		1

TABLE 7-1. POSSIBLE GROUND-WATER CONTAMINATION SOURCES IN THE EASTERN SAN FERNANDO VALLEY IN 1953-1954

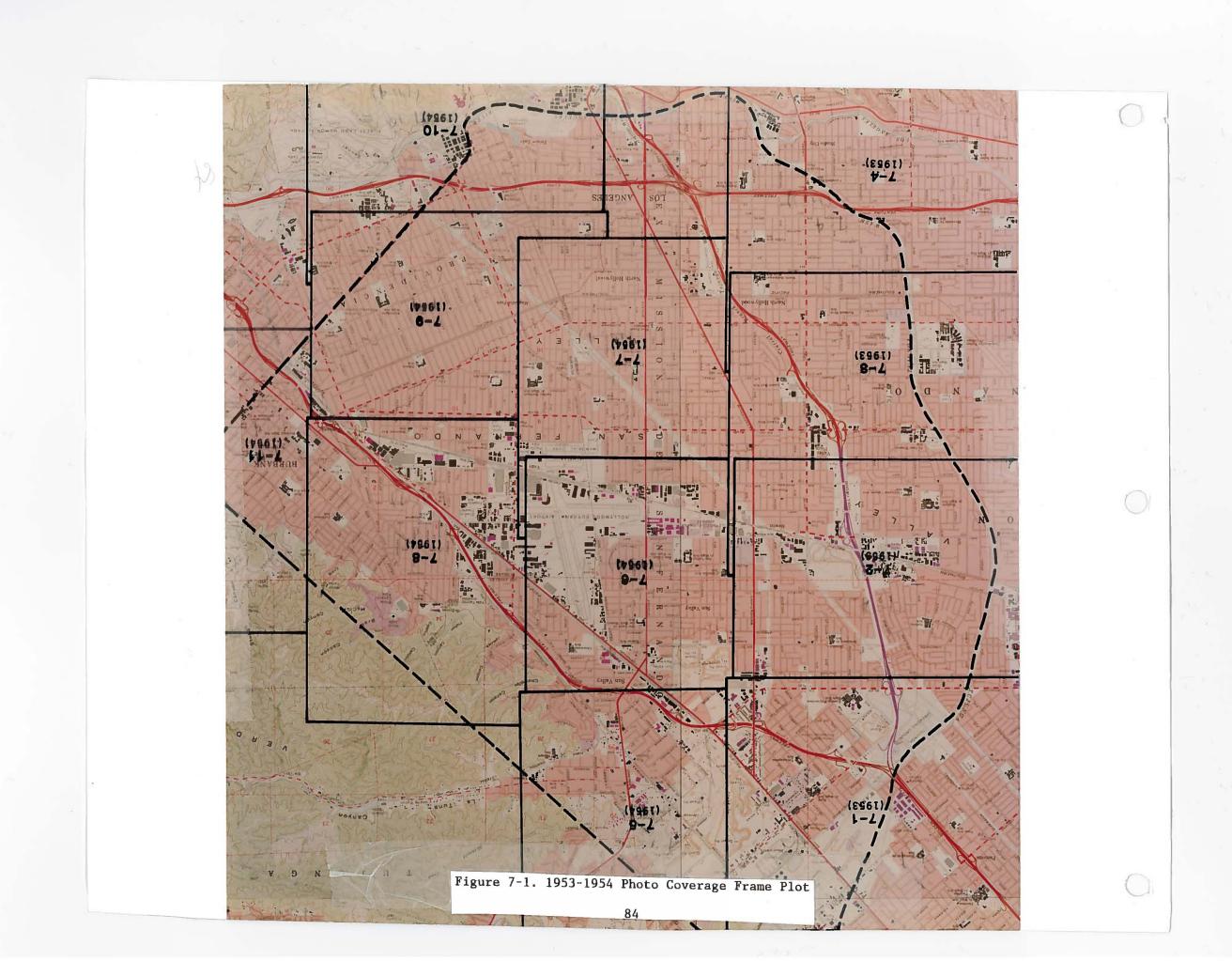
Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1952
7-1	Los Angeles Los Angeles	San Fernando & Branford San Fernando & Branford	2-Vacant lot	1-No visible evidence of pollution. 2-Trench. No waste disposal evident.	
	Los Angeles	San Fernando & Sheldon	3-Power plant	3-Two uncontained and three contained vertical tanks. Standing liquid in a pit, probably water.	3-Continued development of the site.
	Los Angeles	Wicks & Sharp	4-Gravel pit	4-No visible evidence of pollution.	4-Pit enlarged since 1952.
7-2	Los Angeles	Roscoe & Sheldon	l-Tujunga spreading grounds	1-No visible evidence of pollution.	1-Spreading grounds expanded.
	Los Angeles	Lankershim & Cantara	2-Small industrial fac.	2-White-toned spoil deposits.	2-Staining gone but new spoil present.
	Los Angeles	Greenbush & Sherman	3-Solid waste dump	3-Solid waste deposits.	3-Previously undeveloped.
	Los Angeles	Raymer & Ethel	4-Small industrial fac.	4-No visible evidence of pollution.	4-Staining no longer visible.
	Los Angeles	Laurel Canyon & Valerio	5-Gravel pit	5-Standing liquid, probably water.	5-Expansion of pit.
	Los Angeles	Sherman & Laurel Canyon	6-Small industrial fac.	6-No visible evidence of pollution.	6-No change.
7-3	Los Angeles	Laurel Canyon & Victory	1-Commercial facility	1-Large spill stain originating at main building.	1-New staining.
	Los Angeles	Laurel Canyon & Victory	2-Fuel distribution facility	2-Four contained vertical tanks.	2-Site previously undeveloped.
7-4	Los Angeles				**
7-5	Los Angeles	Peoria & Glenoaks	1-Gravel pit	1-No visible evidence of pollution.	1-Pit has been enlarged since 1952.
	Los Angeles	Pendleton & Glenoaks	2-Old gravel pit	2-No visible evidence of pollution.	2-No change.
	Los Angeles	San Fernando & Tuxford	3-Gravel extraction cmplx	3-Extensive dark- and light-toned stains and two impoundments at the	3-Increased staining and expanded mining activity.
				waste disposal area. Stains also visible at two other points in the	
				pit. Standing liquid may have been contamination.	_ = - '
	Los Angeles	Glenoaks & Peoria	4-Gravel pit	4-Numerous large crates dumped in east side of pit.	4-Pit has been expanded and crates dumped. Part of site now a waste disposal facility.
	Los Angeles	Bradley & Pendleton	5-Waste disposal facility	5-Large deposits of solid waste being buried in south pit and some also	5-Increased waste burial in the area.
	¥*			at north pit. Impoundment in north pit.	
+	Los Angeles	San Fernando & Tuxford	6-Industrial facility	6-Dark staining.	6-Staining still visible in same area.
7-6	Los Angeles Los Angeles	San Fernando & Tuxford Tujunga & Strathern	1-Gravel pit 2-Gravel extraction cmplx	1-No visible evidence of pollution. 2-Staining from liquid dumped along north side of western pit and accumulated liquid in bottom. Standing liquid probably water in southeast pit.	1-Expansion of pit. 2-Northeast pit now filled in as facility 3. Expansion of other pits.

TABLE 7-1. CONTINUED

Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1952
	Los Angeles	Tujunga & Roscoe	3-L _{andfill}	3-Large deposits of solid waste; staining from liquid waste dumping at two points in the facility. Numerous unidentified objects scattered at "A."	3-Gravel pit has been filled in, probably with buried waste.
	Los Angeles	San Fernando & Roscoe	4-Small industrial fac.	4-Extensive light-toned stain at building.	4-Staining more extensive.
	Los Angeles	San Fernando & Clybourn	5-Industrial facility	5-No visible evidence of pollution.	5-No change.
	Los Angeles	Sherman & Lankershim	6-Manufacturing facility	6-Staining and standing liquid in open storage areas.	6-Decrease in amount of staining visible.
	Los Angeles	Hart & Lankershim	7-Industrial facility	7-Large spill stain originating at main building. Threat to storm drain system.	7-Site previously undeveloped.
	Los Angeles	Tujunga & Vanowen	8-Industrial facility	8-No visible evidence of pollution.	8-No change.
	Los Angeles	Sherman & Tujunga	9-Gravel pit	9-Small scale evidence of waste dumping in pit.	9-New dumping.
	Burbank	Clybourn & Saticoy	10-Gravel pit	10-Standing liquid and fill.	10-No solid waste currently visible.
	Burbank	Clybourn & Sherman	11-Hollywood-Burbank airport	11-Extensive staining at "C". Staining assoc. with parked air- craft at five points. Two other	11-Staining in similar areas.
				spill stains in south part of complex unidentified liquid pattern also visible on runway.	
	Burbank	Vanowen & Vineland	12-Vacant lot	12-Heavy, dark-toned pattern at "B" may be a stain or burn area as smoke plume is visible.	12-Previously no activity.
	Burbank	Vanowen & Clybourn	13-Aircraft support facility	13-No visible evidence of pollution.	13-No change.
7-7	Los Angeles	Victory & Vineland	1-Old gravel pit	1-Landfilling of solid waste in bottom of pit.	1-Increased waste disposal since
	Los Angeles	Lankershim & Victory	2-Small commercial fac.	2-Dark staining in open area.	2-Previously no staining.
	Los Angeles	Clybourn & Burbank	3-Substation	3-Staining at three transformers.	3-New staining visible.
	Los Angeles	Burbank & Cahuenga	4-Small industrial fac.	4-No visible evidence of pollution.	4-1952 photocoverage Unavailable
	Los Angeles	Vineland & Chandler	5-Industrial complex	5-No visible evidence of pollution.	5-1952 photocoverage Unavailable
	Los Angeles	Lankershim & Chandler	6-Industrial complex	6-No visible evidence of pollution.	6-1952 photocoverage Unavailable
	Los Angeles	Vineland & Chandler	7-Small industrial fac.	7-No visible evidence of pollution.	7-1952 photocoverage Unavailable
	Los Angeles	Lankershim & Chandler	8-Industrial facility	8-Staining in open storage. Crates stacked in 2 groups also present.	8-1952 photocoverage Unavailable
	Los Angeles	Tujunga & Chandler	9-Small industrial fac.	9-No visible evidence of pollution.	9-1941 photocoverage Unavailable
	Los Angeles	Tujunga & Chandler	10-Commercial facility	10-Crates and dark-toned staining in open area.	
	Los Angeles	Clybourn & Chandler	11-Chemical plant	11-One uncontained vertical tank.	11-1941 photocoverage Unavailable

TABLE 7-1. CONTINUED

Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1952
7-8	Burbank Burbank	Hollywood & Glenoaks San Fernando & Hollywood	1-Small industrial fac. 2-Aircraft manufacturing and maintenance fac.	1-No visible evidence of pollution. 2-Heavy staining associated with parked aircraft.	1-Staining no longer visible. 2-No change.
	Burbank	San Fernando & Hollywood	3-Small industrial complex	3-No visible evidence of pollution.	3-No change.
	Burbank	Kenneth & Ontario	4-Industrial facility	4-No visible evidence of pollution.	4-Staining no longer visible.
	Burbank	Tulare & Ontario	5-Industrial manufacturing facility	5-No visible evidence of pollution.	5-Staining no longer visible.
	Burbank	Tulare & Naomi	6-Small industrial fac.	6-Staining apparently from dumping.	6-No change.
	Burbank	San Fernando & Ontario	7-Small industrial fac.	7-No visible evidence of pollution.	7-Staining no longer visible.
	Burbank	San Fernando & Ontario	8-Small industrial fac.	8-Numerous crates, but no visible evidence of pollution.	8-No change.
	Burbank	San Fernando & Naomi	9-Small industrial fac.	9-No visible evidence of pollution.	9-Facility has been subdivided.
	Burbank	Ontario & Winona	10-Industrial facility	10-No visible evidence of pollution.	10-No change.
	Burbank	Ontario & Winona	11-Commercial/industrial complex	11-A large spill stain originating at the edge of the parking area has flowed off site.	11-Presence of spill.
	Burbank	Ontario & Winona	12-Commercial facility	12-Staining in unpaved open area at tank truck.	12-Presence of stain.
	Burbank	Hollywood & Winona	13-Industrial facility	13-No visible evidence of pollution.	
	Burbank	Hollywood & Thornton	14-Aircraft manufacturing facility	14-No visible evidence of pollution.	14-Staining no longer visible.
7-9	Burbank	San Fernando & Empire	1-Large aircraft mfg. facility	1-No visible evidence of pollution.	1-Staining no longer visible.
	Burbank	Pacific & Hollywood	2-Small industrial fac.	2-One uncontained vertical tank. Discharge also emptying into off-si impoundment.	2-New discharge. te
7-10	Burbank		None Noted		
7-11	Burbank	San Fernando & Burbank	1-Aircraft manufacturing support facility	1-No visible evidence of pollution.	1-No change.
	Burbank	Magnolia & Burbank Western Channel	2-Small industrial fac.	2-Twelve uncontained vertical tanks located in close proximity to Burbank Western Channel.	2-No change.
	Burbank	Olive & Burbank Western Channel	3-Power plant complex	3-Three uncontained vertical tanks.	3-No change.
	Burbank	San Fernando & Olive	4-Small industrial fac.	4-Five contained vertical tanks on edge of Burbank Western Channel.	4-Addition of two tanks.





STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

ST STAIN

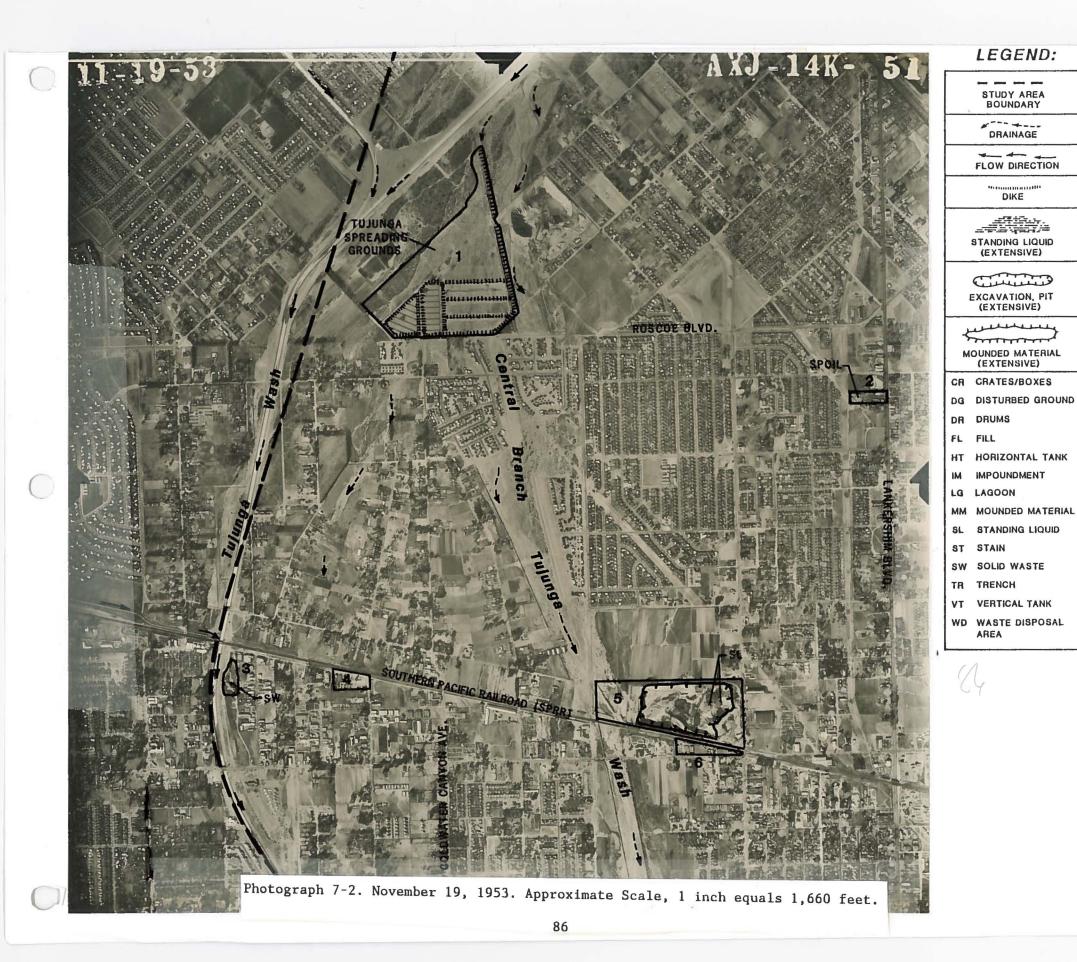
SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK

WD WASTE DISPOSAL

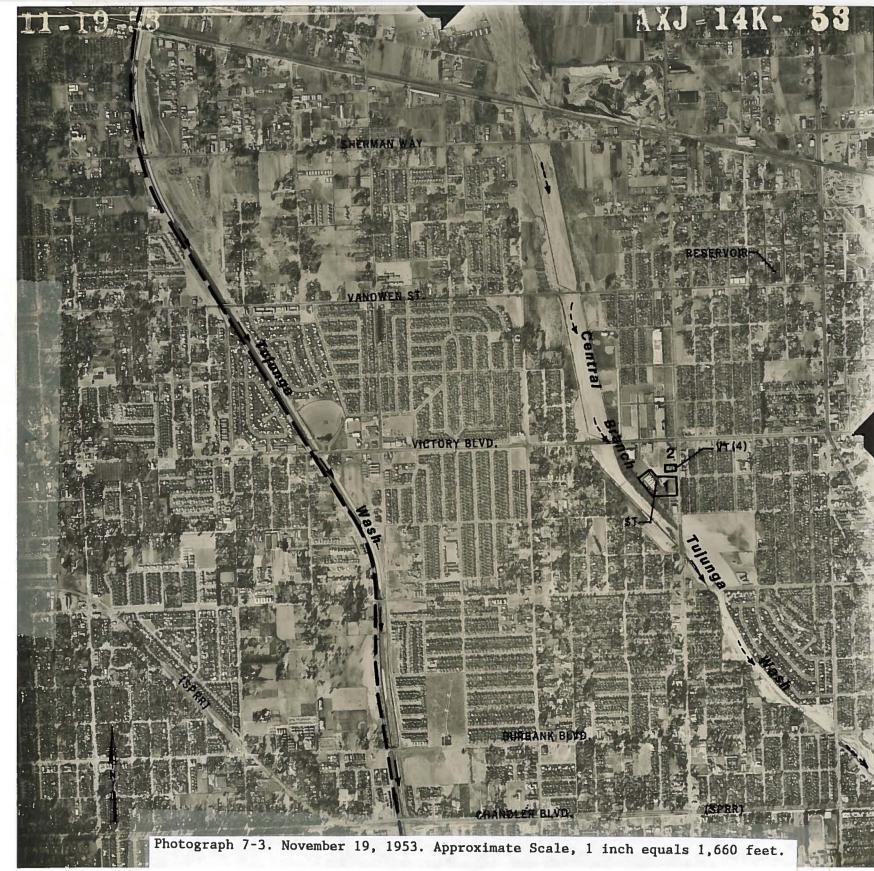
AREA



STUDY AREA BOUNDARY

DRAINAGE

DIKE



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STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID
(EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

- CR CRATES/BOXES
- DG DISTURBED GROUND
- DR DRUMS
- FL FILL
- HT HORIZONTAL TANK
- IM IMPOUNDMENT
- LG LAGOON
- MM MOUNDED MATERIAL
- SL STANDING LIQUID
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VT VERTICAL TANK
- WD WASTE DISPOSAL AREA



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

- CR CRATES/BOXES
- DG DISTURBED GROUND
- DR DRUMS
- FL FILL
- HT HORIZONTAL TANK
- IM IMPOUNDMENT
- LG LAGOON
- MM MOUNDED MATERIAL
- SL STANDING LIQUID
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VT VERTICAL TANK
- WD WASTE DISPOSAL AREA



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK



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STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

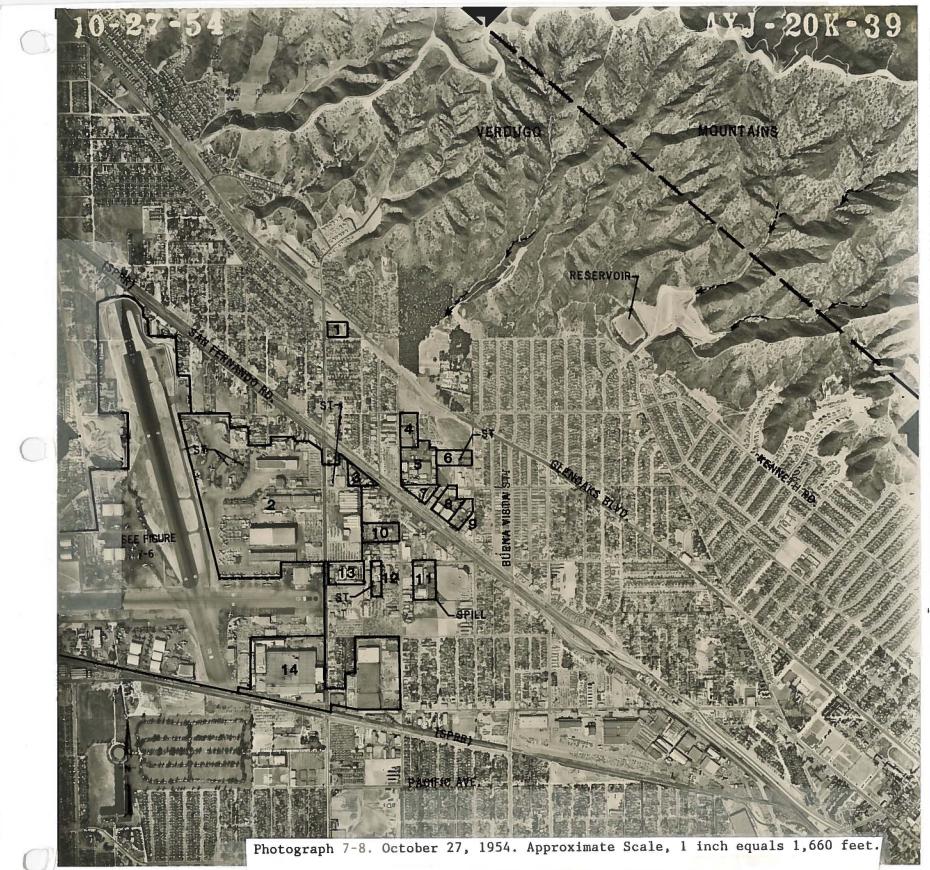
SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

muning personal per MOUNDED MATERIAL (EXTENSIVE)

- CR CRATES/BOXES
- DG DISTURBED GROUND
- DR DRUMS
- FL FILL
- HT HORIZONTAL TANK
- IM IMPOUNDMENT
- LG LAGOON
- MM MOUNDED MATERIAL
- SL STANDING LIQUID
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VT VERTICAL TANK
- WD WASTE DISPOSAL AREA





LEGENU:

STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

HT HORIZONTAL TANK
IM IMPOUNDMENT
LG LAGOON

MM MOUNDED MATERIAL SL STANDING LIQUID

DR DRUMS

ST STAIN

SW SOLID WASTE TR TRENCH

VT VERTICAL TANK
WD WASTE DISPOSAL
AREA

8.0 1964 AERIAL PHOTOGRAPHIC DATA ANALYSIS

8.1 Summary of Observations for 1964

The 1964 photography shows the same vignetting effects as the 1952 and 1953-1954 photography but the overall quality is good. The photography was acquired at a nominal scale of 1:24,000 (1 inch equals 2,000 feet). Due to the small scale, the same limits on spatial resolution are present as on the other photocoverage acquired during 1952, 1953, and 1954. The 1964 photography is the first data set to provide complete coverage of the study area on the same date. The photography shows a significant increase in the amount of urbanized land within the study area, with virtually no agricultural land remaining. Most of the development is residential. Industrial development was concentrated in the same areas as in previous years, with some increase in industrial activity along the Southern Pacific Railroad where an extensive commercial/industrial corridor is now located.

Several changes in the surface hydrology within the study area are evident in 1964. The Hansen Heights Channel and La Tuna Canyon Lateral are now completed. Sections of the Burbank Western Channel upstream of Burbank Boulevard have also been channelized since 1954. Construction of the Hollywood Freeway in the stream bed of Central Branch Tujunga Wash is noted. An aqueduct is being built to carry runoff which previously followed the stream bed. No changes are evident at the spreading grounds, and both appear to be free of contamination.

Increased waste disposal activity is evident at the gravel pit complexes in the northern part of the study area. A new gravel pit has been dug in this area. Three gravel pits visible in 1954 have been filled in. Activity at the Hollywood-Burbank Airport remains at a high level; increased spillage and staining are visible, especially around parked aircraft. No waste disposal is currently visible at the pit adjacent to the airport. Sixteen industrial or commercial facilities are located around the airport; however, a decrease in possible waste disposal or contamination-producing activity is observed in these areas.

The following is a breakdown of observed potential ground-water contamination sources for 1964.

General Facility Type	Number Observed
Small Industrial Facilities	23
Gravel Pit Complexes Aircraft Manufacturing	9
Facilities	5
Dumps	2
Airports	1
Commercial Facilities Utility Facilities	10 3
Chemical Facilities	1

TABLE 8-1. POSSIBLE GROUND-WATER CONTAMINATION SOURCES IN THE EASTERN SAN FERNANDO VALLEY IN 1964

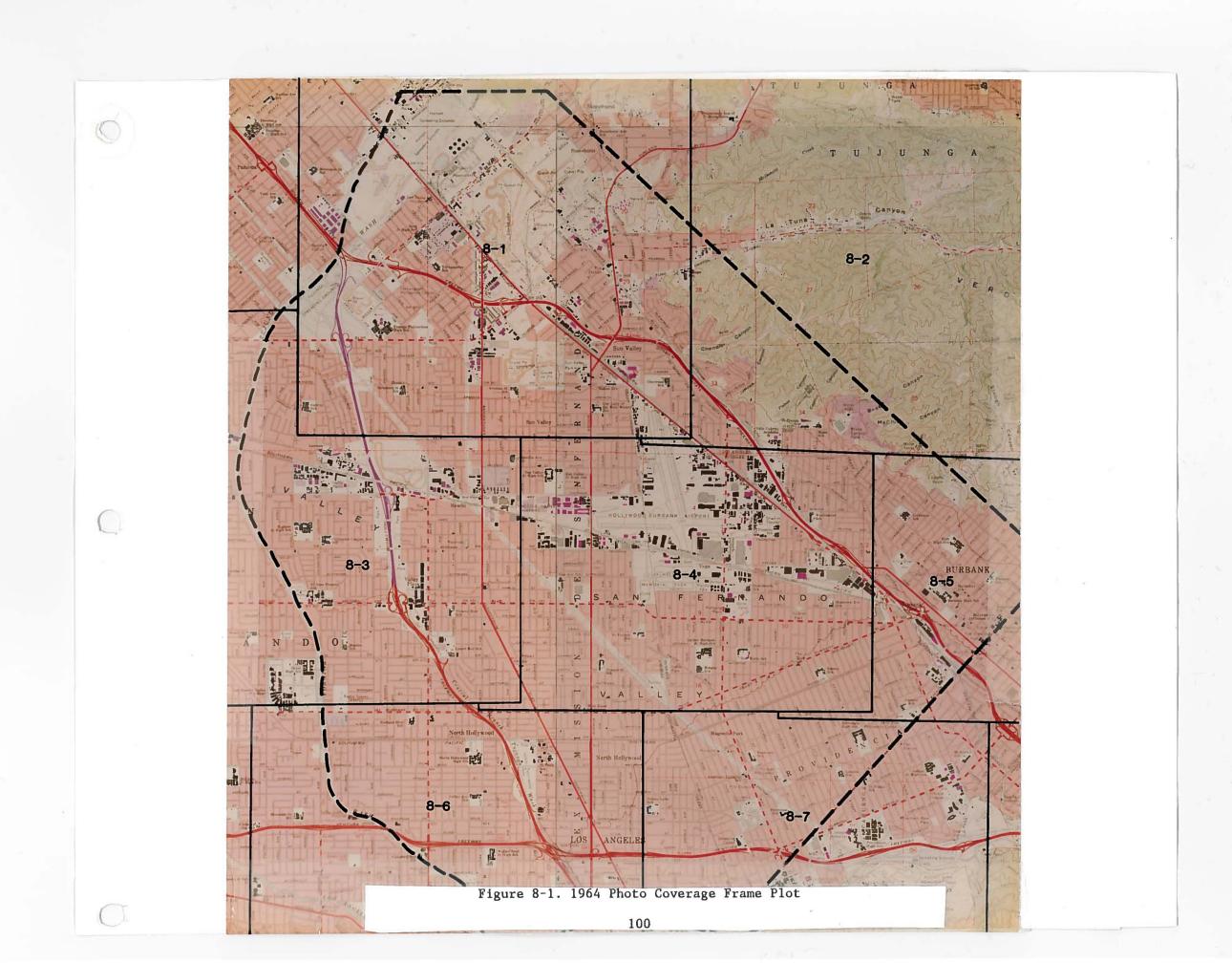
Photo- graph Number	Administrative Area	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1952
8-1	Los Angeles	San Fernando & Branford	1-Hansen spreading grounds	1-No visible evidence of pollution.	1-No change.
	Los Angeles	San Fernando & Sheldon	2-Power plant	2-One uncontained vertical tank, eight contained vertical tanks, one lagoon, and large pit with standing liquid.	2-Addition of five tanks, lagoon, and expansion of pit.
	Los Angeles	San Fernando & Branford	3-Commercial facility	3-Heavy, dark-toned staining.	3-Site previously undeveloped.
	Los Angeles	Peoria & Glenoaks	4-Gravel pit	4-No visible evidence of pollution.	4-Expansion of the pit.
	Los Angeles	Peoria & Glenoaks	5-Gravel pit	5-No visible evidence of pollution.	5-Site previously undeveloped.
	Los Angeles	Glenoaks & Pendleton	6-Commercial facility	6-Numerous tanks and heavy staining.	6-Site previously undeveloped.
	Los Angeles	Pendleton & Glenoaks	7-Old Gravel pit	7-No visible evidence of pollution.	7-No change.
	Los Angeles	San Fernando & Tuxford	8-Gravel extraction cmplx	8-Three new impoundments and solid waste dumping. Standing liquid at the site is probably process	8-Two impoundments removed and 3 added. No staining visible, but solid waste dumping observed.
				wastewater or precipitation.	
	Los Angeles	Glenoaks & Peoria	9-Old gravel pit	9-Spoil dumped on filled-in pit.	9-Pit filled in.
	Los Angeles	Bradley & Pendleton	10-Waste disposal facility	10-Staining at two points and three impoundments. Crates stacked on old fill area.	10-Both pits have been mostly filled in.
	Los Angeles	San Fernando & Tuxford	11-Industrial facility	11-Staining still visible.	11-Site has been altered by freewa construction. Staining at same place.
	Los Angeles	Wicks & Sharp	12-Gravel pit	12-No visible evidence of pollution.	12-Change in pit configuration.
	Los Angeles	Tujunga & Strathern	13-Gravel extraction complex	13-Standing liquid (probably water) in pit.	13-Expansion of west pit.
	Los Angeles	Roscoe & Tujunga	14-Commercial/industrial facility	14-Ground staining, possibly dust control.	14-Site previously residential.
	Los Angeles	Roscoe & Tujunga	15-Landfill	15-Mounded fill.	15-No staining or dumping currently visible.
	Los Angeles	San Fernando & Roscoe	16-Small industrial facility	16-No visible evidence of pollution.	16-No staining visible.
	Los Angeles	Clybourn & Cantara	17-Industrial complex	17-No visible evidence of pollution.	17-Expansion of facilities in the site.
8-2			None noted		,
8-3	Los Angeles	Roscoe & Sheldon	1-Tujunga spreading grnds	1-No visible evidence of pollution.	1-No change.
	Los Angeles	Raymer & Ethel	2-Small industrial fac.	2-No visible evidence of pollution.	2-No change.
	Los Angeles	Coldwater Canyon & Raymer	3-Commercial facility	3-Dark-toned stain in open area.	3-New staining.
	Los Angeles	Coldwater Canyon & Sherman	4-Commercial facility	4-Dark-toned stain in open storage area.	4-New staining.
	Los Angeles	Sherman & Bellaire	5-Small industrial fac.	5-Heavy, dark stains in open storage area probably from a spill.	
	Los Angeles	Laurel Canyon & Valerio	6-Gravel pit	6-No visible evidence of pollution.	6-Expansion of the main pit.

TABLE 8-1. CONTINUED

Photo-	Administrati	Administrative Major		Potential		T	
graph Number	Area		Cross Streets	Contamination Source	Description/Comment	Change from 1953-1954	
	Los Angeles	Laure	el Canyon & Sherman	7-Small industrial fac.	7. No visible evidence of pollution.	7-No change.	
	Los Angeles	Laure	el Canyon & Sherman	8-Commercial facility	8-Ground staining in parking area.	8-Presence of stain.	
	Los Angeles	Laure	el Canyon & Sherman	9-Commercial facility	9-Staining in open area (possibly from a spill).	9-Presence of stain.	
8-4	Los Angeles		ershim & Sherman	1-Manufacturing facility	1-No visible evidence of pollution.	1-Staining no longer visible.	
	Los Angeles		ven & Tujunga	2-Commercial facility	2-Heavy staining in an open area.	2-New staining present.	
	Los Angeles	Vanov	wen & Tujunga	3-Industrial facility	3-Dark-toned stains in open storage areas originating at a building.	3-New stains at upgraded site.	
	Los Angeles	Tujur	nga & Vanowen	4-Industrial facility	4-Dark-toned stain is visible in open storage area.	4-New staining.	
	Los Angeles	Vanov	ven & Clybourn	5-Aircraft Support fac.	5-No visible evidence of pollution.	5-No change.	
	Burbank	Clybo	ourn & Sherman	6-Hollywood-Burbank Airport	6-Staining associated with parked aircraft open storage areas and heavy traffic areas at "C".	6-Small change in staining pattern. Spillage at runway. Enlargement of the airport.	
			*		Spillage has flowed east along		
	Burbank	C1ybo	ourn & Saticoy	7-Gravel pit	runway but does not leave site. 7-Pit partially filled in. No visible evidence of pollution.	e 7-Filling of part of the pit.	
	Burbank	San F	Fernando & Hollywood	8-Aircraft manufacturing facility	8-Dark-toned spillage at parked aircraft.	8-Decrease in staining except for spill.	
	Burbank	San I	Fernando & Hollywood	9-Small industrial complex	9-No visible evidence of pollution.	9-No change.	
	Burbank	Kenne	eth & Ontario	10-Industrial facility	10-No visible evidence of pollution.	10-Expansion of site.	
	Burbank	Kenne	eth & Ontario	ll-Industrial mfg. facility	11-No visible evidence of pollution.	11-No change.	
	Burbank	Tular	re & Ontario	12-Small industrial facility	12-No visible evidence of pollution.	12-No change.	
	Burbank	San I	Fernando & Ontario	13-Small industrial facility	13-No visible evidence of pollution.	13-No change.	
	Burbank	Ontar	rio & Winona	14-Industrial facility	14-No visible evidence of pollution.	14-No change.	
	Burbank	Ontar	rio & Winona	15-Commercial/industrial facility	15-No visible evidence of pollution.	15-No change.	
	Burbank	Ontai	rio & Thornton	16-Small industrial facility.	16-No visible evidence of pollution.	16-No change.	
	Burbank	Holly	wood & Thornton	17-Aircraft manufacturing facility	17-No visible evidence of pollution.	17-Site previously agricultural.	
	Burbank	Empir	ce & Buena Vista	18-Small industrial facility	18-No visible evidence of pollution	Site previously storage area.	
8-5	Burbank	Empir	re & San Fernando	1-Aircraft manufacturing facility	1-No visible evidence of pollution.	1-No change.	
	Burbank	Burba	ank & Victory	2-Commercial facility	2-Dark staining in area with debris and possible solid waste.	2-New debris and staining rear part of site.	
	Burbank	San I	Fernando & Burbank	3-Aircraft manufacturing support facility	3-No visible evidence of pollution.	3-Part of site removed.	

TABLE 8-1. CONTINUED

Photo- graph Number	Administrat Area	ive	Major Cross Streets	Potential Contamination Source	Description/Comment	Change from 1953-1954
	Burbank		nolia & Burbank tern Channel	4-Small industrial fac.	4-Fifteen uncontained vertical tanks located in close proximity to Burbank Western Channel.	4-No change.
8-6	Los Angeles Los Angeles Los Angeles Los Angeles	Tujunga & Chandler Lankershim & Chandler Lankershim & Chandler Lankershim & Chandler		1-Small industrial fac. 2-Industrial facility 3-Industrial complex 4-Industrial complex	1-No visible evidence of pollution. 2-No visible evidence of pollution. 3-No visible evidence of pollution. 4-No visible evidence of pollution.	1-No change. 2-Staining no longer visible. 3-No change. 4-No change.
8-7	Los Angeles Los Angeles Burbank Burbank	Cly Oli	bourn & Burbank bourn & Chandler ve & Burbank Western Fernando & Olive	1-Substation 2-Chemical plant 3-Power plant 4-Small industrial facility	1-No visible evidence of pollution. 2-Thirteen vertical tanks. 3-Five contained vertical tanks. 4-No visible evidence of pollution.	1-No change. 2-Addition of tanks. 3-Addition of two new tanks. 4-Removal of all five vertical tanks.





STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID
(EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

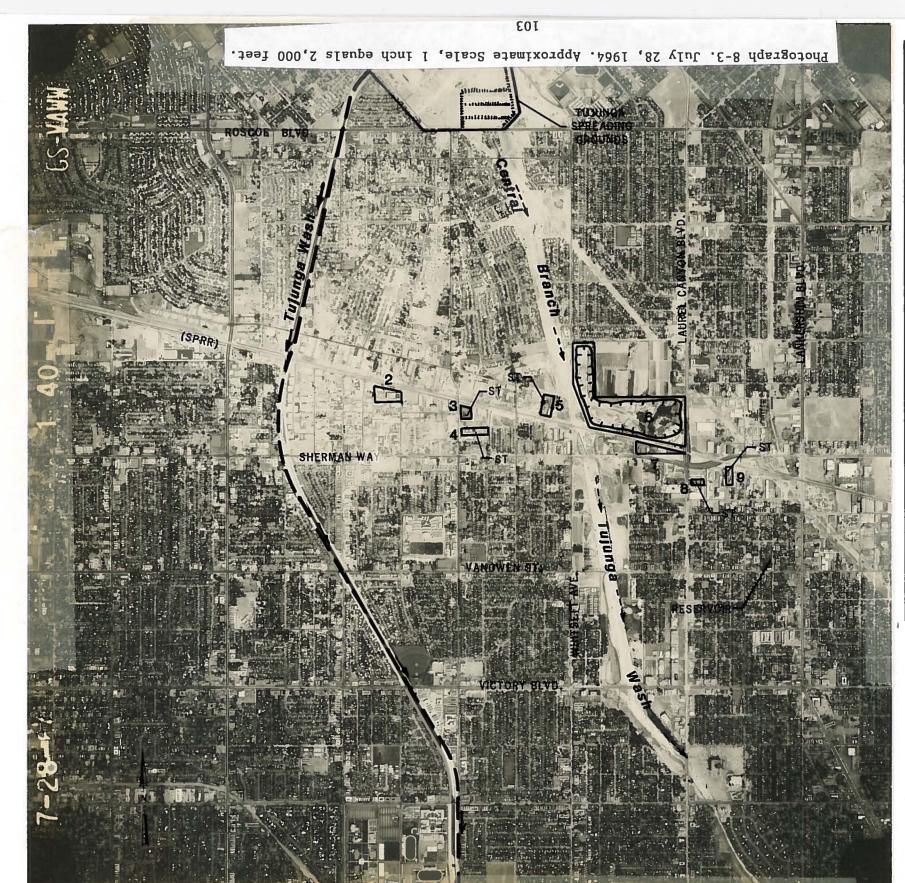
ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK

WD WASTE DISPOSAL



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

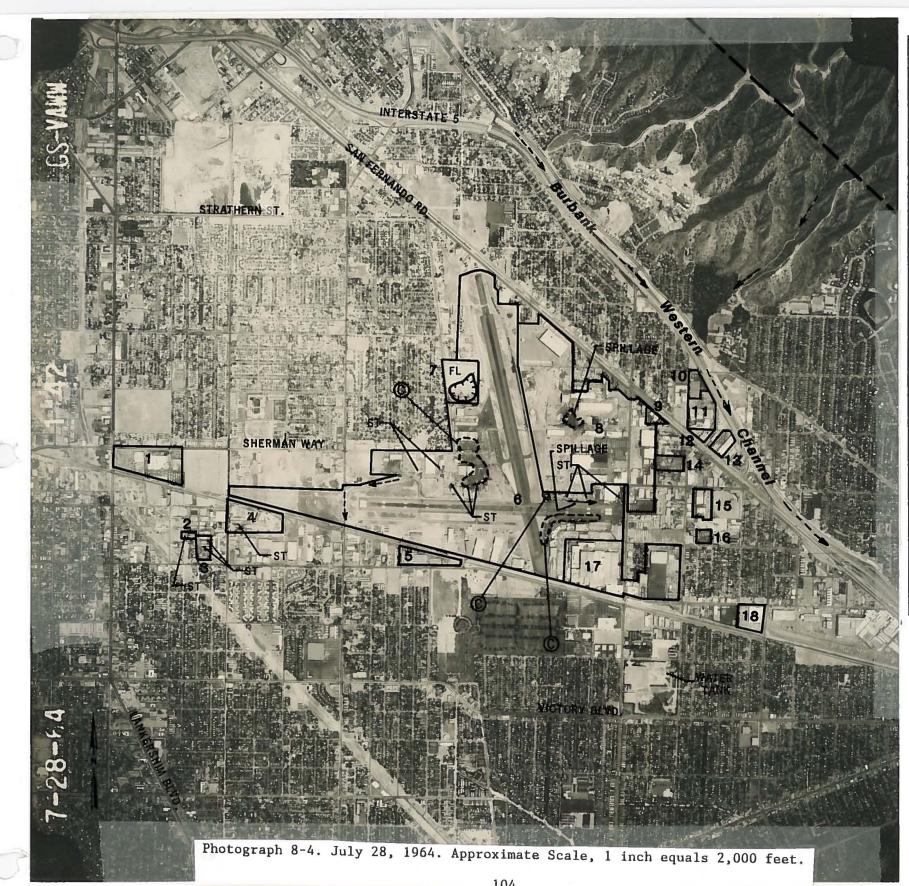
DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

the same

- CR CRATES/BOXES
- DG DISTURBED GROUND
- DR DRUMS
- FL FILL
- HT HORIZONTAL TANK
- IM IMPOUNDMENT
- LG LAGOON
- MM MOUNDED MATERIAL
- SL STANDING LIQUID
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VT VERTICAL TANK
- WD WASTE DISPOSAL



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

- CR CRATES/BOXES
- DG DISTURBED GROUND
- DR DRUMS
- FL FILL
- HT HORIZONTAL TANK
- IM IMPOUNDMENT
- LG LAGOON
- MM MOUNDED MATERIAL
- SL STANDING LIQUID
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VT VERTICAL TANK
- WD WASTE DISPOSAL AREA



STUDY AREA BOUNDARY

DRAINAGE

FLOW DIRECTION

DIKE

STANDING LIQUID (EXTENSIVE)

EXCAVATION, PIT (EXTENSIVE)

MOUNDED MATERIAL (EXTENSIVE)

CR CRATES/BOXES

DG DISTURBED GROUND

DR DRUMS

FL FILL

HT HORIZONTAL TANK

IM IMPOUNDMENT

LG LAGOON

MM MOUNDED MATERIAL

SL STANDING LIQUID

ST STAIN

SW SOLID WASTE

TR TRENCH

VT VERTICAL TANK

Photograph 8-6. July 28, 1964. Approximate Scale, 1 inch equals 2,000 feet.

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9.0 1964 AERIAL PHOTOGRAPHIC DATA (SMALL SCALE) ANALYSIS

9.1 Surface Hydrologic Features

The 1964 small-scale photograph is unique in that it provides total coverage of the study area and surroundings within a single image. The image center is near the intersection of the Hollywood Freeway and Chandler Boulevard. The image is approximately 14 miles on each side and covers approximately 200 square miles.

The major hydrogeological features representing discharge (well fields), recharge (spreading grounds), and stream-flow (channels and washes) have been identified on the photograph. Stream flow enters the study area from Tujunga Wash and La Tuna Canyon Lateral. Tujunga Wash originates from runoff on the south-facing slopes of the San Gabriel Mountains. La Tuna Canyon Lateral originates from runoff on the Verdugo Mountains into La Tuna Canyon. Tujunga Wash discharges into Hansen Lake behind Hansen Dam and is released via a spillway into the wash channel. Diversion of Tujunga Wash occurs at the Hansen and Tujunga spreading grounds. Release can occur into Central Branch Tujunga Wash from Tujunga spreading grounds. The wash corridor is visible in the 1964 photograph but has since been obscured by the Hollywood Freeway right-of-way. Tujunga Wash and Central Branch both discharge to the Los Angeles River.

La Tuna Canyon Lateral is joined by the Hansen Heights Channel in Sun Valley. The combined stream-flow becomes the Burbank Western Channel, paralleling the Golden State Freeway, before discharging into the Los Angeles River. An additional unnamed channel originates near the western end of the east-west runway at Hollywood-Burbank Airport, turns southeast paralleling Empire Avenue and the Southern Pacific Railroad, then joins Burbank Western Channel near the Empire-San Fernando Road intersection.

The streams and channels in the study area are classified as intermittent, flowing only in response to runoff from snowmelt, rain, or release from holding structures.

The general locations of seven main well fields have also been indicated on the photograph.

9.2 <u>Commercial-Industrial Land Use Zones</u>

Another 1964 small-scale photograph provides the basis for an analysis of commercial-residential land use zones in the study area. These areas have been identified mainly on the basis of higher spectral reflectance (brighter tones) than surrounding noncommercial and industrial zones. The main discriminator here is an absence of trees and other vegetation that characterize the sprawling residential subdivisions in the study area. Vegetated areas tend to have lower spectral reflectance (darker tones). Also used to define these zones is building size. In general, buildings and structures inside commercial-industrial areas are much larger and therefore

present a noticeably different photographic texture from residential structures. The outlined areas on the aerial photograph include, but are not limited to strip developments along highways; transportation, utilities, and communication facilities; commercial and services activities; light-to-heavy manufacturing facilities; and those areas used for quarry, mining, and gravel pits.

The outlined areas represent those most intensively developed and builtup in the study area and are characterized by their interconnection over large areas. Due to the very small scale of the interpreted image, smaller, less continuous or isolated commercial-industrial land use zones cannot be outlined effectively.

The purpose of the image is to identify those areas most likely to contain possible ground-water contamination sources in the study area. Three general patterns of commercial-industrial land use emerged. The first and most prominent is an east-west corridor along the southern Pacific Railroad and Hollywood-Burbank Airport from Burbank to Tujunga Wash. Included in this area are two intensively developed blocks of land north of the San Fernando Road in Burbank. The second is the extensive gravel pit complex between Hansen Dam and the Sun Valley area, and nearby the electric utility station. The third area is an intensively commercialized area near the Burbank-Lankershim Boulevard intersection in North Hollywood.



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